The Therapeutic Gazette

Whole Series Vol. XLVIII | DETROIT, MICH., NOVEMBER 15, 1924 | Third Series Vol. XL, No. 11

Original Articles

The Surgical Treatment of Angina Pectoris

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There has, in recent years, been an endeavor on the part of surgeons to seek for new fields, and there seems no region of the body which the surgeon is not prepared to invade. The impression has got abroad that the feats of the surgeon are indications of the progress of medicine. When operations are carried out with a full knowledge of the morbid conditions which it is intended to relieve, and with a knowledge of the functions of the structures which the surgeon cuts in his operation, there might be some reason for regarding such surgery as an example of the progress of medicine, but when the surgeon is profoundly ignorant of the morbid condition for which he operates, and of the functions of the structures which he mutilates, it is impossible to conceive anything more detrimental to progress. At one time the surgeon was supposed to have a knowledge which would enable him to make not only a diagnosis but a prognosis, so that he could tell whether his interference would be to the patient's benefit. But the trend of modern medicine with its specialism is, that the surgeon dispenses with this kind of knowledge and relies upon others for instructions when to operate, so that he tends to become more and more merely a dexterous wielder of the knife and the needle.

This tendency is well illustrated in the surgeon's excursions into the treatment of angina pectoris. I do not suppose there is a surgeon who would even pretend to understand the morbid condition which gives rise to the symptom-complex called angina pectoris. The knowledge of the functions of the vagus and the sympathetic which the surgeon cuts is so imperfect that neither he nor the physician who advises him understands but a fraction of the functions of these nerves.

THE PRESENT KNOWLEDGE OF HEART PAIN.

Before such a formidable and dangerous operation is undertaken it is advisable that the state of knowledge of the diseased conditions which are associated with or give rise to angina pectoris should be recognized.

It is a reflection on the state of medicine that such a clamant, distressful and universal symptom as pain should be so little understood that it is impossible to tell what the agents are which are concerned in its production. It is not even known how to proceed to find them out. It is recognized that there are structures which, when mechanically stimulated, produce pain, and other structures which, when so stimulated, do not produce pain, but which by other forms of stimulation do give rise to pain. Anatomy cannot tell us the difference in the nerve supply which this observation indicates, nor can physiology tell us the vital processes concerned in the production of pain in organs that cannot be mechanically stimulated to produce pain. The conse-

quence of this state of affairs is that a subject like angina pectoris is still a matter for vague speculation, and the employment of such drastic treatment as a surgical operation for a condition so little known does not redound to the credit of medicine.

The aim of surgical treatment is not to "cure" the disease but, by cutting the nerves which convey impulses from the heart to the central nervous system, to prevent the patient feeling pain. These nerves are the sympathetic and vagus—two nerves whose functions are as imperfectly understood as the nature of angina pectoris. It must be remembered what little is known of these nerves, for experiment is limited practically to the *efferent* part of the nerve. The part played in the economy by the *afferent* part is unknown save for some crude experimental results—and these are imperfectly interpreted. It is the *afferent* nerve which the surgeon seeks to cut, and so this operation is one where structures are cut whose function is unknown, beyond the fact that they convey impulses from the heart to the central nervous system for a condition that is still the subject of speculation.

THE AFTER-HISTORY OF PATIENTS WITH ANGINA.

In an analysis of over 2000 patients who suffered from heart pain lately undertaken by me, the notes of 1000 were discarded as the histories of the patients after the notes were taken were not satisfactorily recorded. In the remaining 1000 the future course of the health of the patients was recorded with sufficient precision to enable certain conclusions of value to be drawn.

The patients could be divided into two groups. One, the smaller, in which the pains were not associated with any disease of the heart, and another group where such disease was present. The pain, its situation and onset, and the other symptoms associated with it were the same in both groups.

In angina pectoris the chief structures concerned are the nervous system and the tissues of the heart, and disturbance of either may result in pain. In the former group the pain is due to disturbance of the nervous system. It has long been recognized that in certain forms of ill health, symptoms due to disturbance of organs which are themselves perfectly healthy may result from disturbances of the nervous system. The most striking of these is vomiting. Pain also is a frequent expression of a similar form of disturbance, so that the pain and other symptoms associated with angina pectoris are not infrequent in people whose hearts are healthy, but who suffer from ill-health which disturbs the nervous system. The vast majority of these patients are women under fifty years of age. During the war numbers of young soldiers showed all the signs of angina pectoris, but they all suffered from some infection, often too obscure for identification, but which in some instances was ultimately found to be "trench fever."

I have followed some hundreds of these cases of "secondary angina" for many years, and not one has died from an affection of the heart; the heart symptoms in every case disappeared, many were restored to health, others were crippled from the persistence of the original complaint or from some of its effects.

In the larger group, "Primary Angina Pectoris," there are morbid changes in the structures of the heart, which are progressive. The first appearance of the signs of angina is as a rule insidious, being usually a slight sense of discomfort, felt across the chest generally on making some form of effort which had hitherto been performed with perfect ease. At first the discomfort may appear at rare intervals, and is brushed aside as indigestion or ignored. In course of time it becomes more frequent, more easily provoked, and may culminate in violent pain, occurring in "attacks." There may only be one severe attack, or there may be a series coming on at intervals of days, weeks, or months. Complete rest being enforced, for a period the attacks sub-

side and the individual may be free from attacks for many years, or there may be a recurrence in a few months; but the tendency never disappears, the attacks being apt to come on under particular circumstances, as on walking after a meal, or against a cold wind, or on first starting after a rest—the patient nevertheless being able to lead a useful life.

In nearly every instance slowly but surely the response to effort becomes restricted and the pain tends to appear with ever-increasing facility. When death arrives, it may be many years after the onset, morbid changes are invariably found at the post-mortem examination, although the physical examination during life may have given no signs of anything amiss.

THE MORBID CHANGES IN ANGINA.

The morbid changes in the vast majority of cases are found mainly in the coronary arteries and in the muscle of the left ventricle. If these changes and the effects they produced during life be studied, some idea can be formed of what "angina pectoris" signifies. Although no two cases are identical, in regard to the part affected, yet the nature of the morbid process and its resultant effects are remarkably alike in the majority. These consist of such narrowing of the lumen of some part of the coronary artery that the supply of blood to the muscle is so diminished as to impair not only the functional efficiency of the muscle, but to lead to degeneration and destructive changes in the heart muscle.

If it be borne in mind that the healthy coronary artery is very distensile, and that when the heart is called upon to increase its work in response to effort there is required a greatly increased supply of blood, not only is the reason for the distensile artery apparent, but also the effect which is bound to follow when the lumen of the artery is narrowed and its walls become rigid.

Angina pectoris is the subject of investigation at the St. Andrews Institute, and so far post-mortem examinations have been made on seven patients, of which the three figures are typical. The results of these examinations are like the fifty odd post-mortem examinations I had made on my own patients, and correspond with numerous published records since Heberden and Jenner's day, so that they may be taken as typical of the more common forms of angina pectoris.

If one inquires what were the evidences shown by such damaged hearts during life, pain, especially in response to effort, was common to all.

The processes which led to these morbid changes must have taken many years. Indeed, one can reasonably infer that they must have been going on for many years before the response to effort was so diminished as to produce the early signs of distress. It is therefore impossible to tell the duration of the morbid processes that lead to angina. The duration of the symptom of "angina pectoris" can only be estimated from the time that pain appeared, and therefore its onset has no relation to the onset of the morbid process which induces the pain. As this symptom depends not only on the morbid condition, but also on the exposure of the individual to conditions that favor the production of pain, the history of the onset is of doubtful value for any purpose. One of my patients reached the age of eighty before he had any pain, and it came on because he was forced to run 100 yards at the top of his speed, an amount of effort he had not undertaken for twenty years.

The study of the morbid changes in the hearts of patients who suffered from angina pectoris bring clearly before the mind what the condition is that the surgeon is to treat when he proposes to operate. No one would claim that he can "cure" angina pectoris by operation or any other procedure. All the surgeon could hope to do would be to cut the nerves that convey the impulses which give rise to pain from the damaged heart to the center of consciousness.

Is such a procedure wise and for the best interest of the patient? Putting aside the question of what damage may be done by the cutting of such important structures

as the *sympathetic and vagus nerves*—nerves whose functions, be it noted, are even yet scarcely understood—and apart from the danger of the operation and the possible damage which may result from the mutilation that accompanies such an operation, the question arises, is it to the best interest of the patient that he should be deprived of a signal, it may be, of great value?

If we look at these hearts it is manifest that they could only accomplish a small part of the work which a heart should perform. Muscles like the heart can be forced to work till a stage is reached when they can do no more work. When this stage is reached no blood can be thrown out, and the consequences of a failure of output is unconsciousness and death. Moreover, one of the provoking causes of ventricular fibrillation is a defective blood supply, and this is a common cause of death in angina pectoris.

On the other hand, a sign given out by muscle when exhausted, and particularly when forced to work when the blood supply is defective, is pain. In the early stages of the suffering the failure to recognize the significance of pain often leads the individual to persist in efforts beyond the heart's capacity, with the result that the exhaustion of the heart muscle reaches a stage that pain of a great severity is induced, which, as already said, may last for a considerable time—until indeed a measure of strength is restored to the heart muscle.

Great numbers of patients get to recognize the significance of pain, and by taking thought of the circumstances that provoke it, can lead useful lives free from distress for many years.

One could cite many instances which throw light upon this matter, but one may suffice as it illustrates several very important features which have not received that consideration which is their due.

A man began to suffer from angina pectoris—the pain coming on only in response to effort. An examination revealed nothing but a systolic aortic murmur. A year later he began to have attacks of loss of consciousness, which were found to be due to partial heart-block. After some months the block became complete, the pulse being constant at the rate of 30 per minute. The attacks of loss of consciousness ceased and he suffered no more from pain. On effort he could do less, and was stopped on account of a sensation of weakness and breathlessness.

Three years after the first appearance of pain he dropped down dead.

At the post-mortem examination the aortic valves were sclerosed, and the sclerosis extended up the aorta and embraced the mouths of the coronary artery, which was rigid and narrowed; it extended down into the heart muscle and had destroyed the auriculoventricular bundle.

It is thus seen that these diverse phenomena, the aortic systolic murmur, angina pectoris, and heart-block, were all produced by the same morbid process.

But the point of interest here is the pain and its cessation. The narrow rigid orifice of the coronary artery manifestly would not dilate to permit an increase of blood to meet the requirements of the muscle, and in consequence the muscle, like all muscles forced to work with deficient blood, gave rise to pain.

When complete heart-block set in, it was impossible for the ventricle to be stimulated to increased effort, for the rate of the ventricle never varied from 30 per minute at rest or on violent effort. Consequently there was no demand for an increased blood supply, and effort was limited, not by pain, but by sensations provoked by a diminished output of blood from the heart.

Great as the distress is which pain produces, pain itself is in no sense a dangerous symptom. It may be associated with conditions which are dangerous, but such dangers are not rendered less dangerous by easing the pain. Indeed it often is a beneficent agent, in directing attention to the presence of a morbid condition, and more especially in warning that the persistence of a particular habit is harmful. It is in this latter sense that pain is beneficent, and occurring in conditions like angina pectoris

it forms one of the most helpful indications for preserving the efficiency of the heart. It is manifest that with a damaged heart muscle the amount of work the heart can perform is limited, and the indication for treatment is to save the heart muscle from overexertion. The measure of the amount of work is found in what can be done without distress. It is well recognized that before pain arises there are faint signs experienced which indicate that with persistence pain will be induced, so that taken as a signal to desist the individual then knows what amount of effort it is safe for him to undertake. In this way many people are able to pursue even laborious occupations with no discomfort and no danger.

To remove this valuable indicator in the present state of our knowledge is, to my mind, extremely hazardous and bad practice. When a better knowledge is acquired it may be found of value in some instances, but so far as I can see there are no indications which would enable suitable cases to be recognized. I have carefully studied the published records of cases operated upon, and these records show no consciousness of that division of angina into primary, with varying degrees of morbid changes, and secondary, with no affection of the heart. Moreover, the records both before and after operation are given so imperfectly that no clear conception of the nature of the condition can be ascertained, except those who died in consequence of the operation.

It must be remembered that, though pain may be relieved, the patient is not "cured" nor is the progress of the disease stayed. As the vast majority of patients live for many years after the first appearance of angina pectoris, the fact that a patient is free from pain for months or years is not evidence that his condition is improved. Such patients as have been operated upon and have recovered from the operation would afford the opportunity for investigation, not only of the results of the section of nerves, but of the response of the heart to effort—to find out not only how the heart's movements are affected, but what are the sensations which warn the patient of the heart's exhaustion. So far the published reports fail to afford this information.

THE NEED FOR REINVESTIGATION OF CARDIAC NERVES.

The attempts to find a reason for employing surgery in the treatment of angina pectoris have revealed that very little of practical value is known about the functions of the vagus and sympathetic nerves, and in consequence plans are being formed for the reinvestigation of these nerves. Before such a laudable enterprise be entered upon it would be well for the investigators to review all the work that has been done on this subject and to study the reasons why so little is still known. It will be found that a great number of experimental observations have been made and certain reactions have been detected, but the interpretations of these reactions are imperfect and unreliable. Thus an increase or a decrease in the rate of the heart may have been recorded, but it is not known what structures were involved in bringing about these changes in rate. The interpretation which holds the field to-day was made at a time when the presence of the conducting system was not even suspected. No movement of the heart can take place without the participation of this system, and so little is known of this system that its study can scarcely be considered to be begun.

Such observations that have been made on these nerves have been almost entirely limited to the *efferent* nerves. In clinical medicine, and especially in dealing with angina pectoris, it is the part played by the *afferent* nerves that has to be known, and except the results of some crude, badly interpreted experiments, nothing is known of the afferent system of nerves. The reason for this is that the afferent system of nerves of the whole body are beyond the range of experimental observation. The most important functional part of the afferent nerve is situated in the fibrils at its peripheral distribution in the skin, and in the substance of the organs, and it is the

manner in which these peripheral fibrils are stimulated which requires to be found out. In experiment, when the nerve is cut, this essential part is cut off and cannot be replaced by electrical stimulation of either cut end. It would be as reasonable to investigate sight by cutting off the eyeball and stimulating the stump of the optic nerve as to investigate the function of an afferent nerve by cutting it and stimulating its stump.

The clinical evidence of the part played by the afferent nerves is abundant. The whole series of phenomena in angina pectoris are but evidences of their activity—the pain, the constriction of the chest, the flow of saliva and other signs are all evidences that impulses have arisen in the heart and have been transmitted to the central nervous system.

So little, indeed, is known that the source and nature of these impulses is still a matter of controversy.

Such matters as these must be considered by would-be investigators, as well as the reason for the defective knowledge which continues in spite of all attempts to find out the function of these nerves. It is likely that it will be found that some concept other than those which have guided research in the past must be employed, and it may come to pass that such an investigation can only be carried out by using the opportunities of the clinical observer.

What Shall We Do With and For Our Cases of Gall-tract Disease?—A Study in Contrasts[1]

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The author has chosen the above title for this paper because of a constantly increasing realization that we are somewhat at odds as to how to properly manage this difficult problem of the upper right quadrant. We have made progress, but have much to learn.

During the last twenty-five years we have recognized that although the surgical mortality risk has been steadily reduced, it is still noticeably high in dealing with problems concerned with the stomach, duodenum, pancreas, and gall-tract. We are also now reaping a crop of post-surgical invalids as a result of various surgical complications, following upper abdominal operations, so that the surgeons themselves, as testified by their numerous recent symposiums, are reviewing their methods with greater care and evincing a very definite dissatisfaction with many of their end results. This is a healthy sign. The surgeon has not been altogether to blame, for he, too often, receives the patient in a stage of advanced pathology, only to be criticized for not being able to perform a miracle. The full-time, thoughtful and well-read operating surgeon has given of his best.

I. NON-SURGICAL DRAINAGE OF THE GALL TRACT—A NEW METHOD OF DIAGNOSIS.

For a number of years the writer has been interested in perfecting a method which permits of detection of gall-tract disease in its earliest beginnings when clinical symptomatology is vague, and long before the operating surgeon can recognize by gross inspection of the gall-bladder and ducts that disease therein actually exists. This method can accurately diagnose catarrhal, inflammatory, infected or adhesive states of the gall-bladder, of the common or

[1]Read before the American Gastroenterological Association, Atlantic City, May 6, 1924.

cystic ducts. It can determine the patency of the ducts. To a certain extent it can determine the functional capacity of the gall-bladder, certainly its dysfunction. It can preoperatively secure evidence of formed gall-stones, or a state of potential lithiasis, where the *x*-ray is negative and the history is vague or atypical, and the abdominal physical findings practically normal. By special tests, it can gain direct evidence of the efficiency of pancreatic and hepatic function. It can go even further and disclose states of *pathological physiology* which are always the forerunner of actual pathology within this tract.*

These are important diagnostic facts to obtain preoperatively, and when properly applied will be of great service to the operating surgeon, and of the highest importance to the welfare of the patient in securing a better end result from a primary operation. When added to the accepted methods of dietetic and chemical therapy, it is the most practical preliminary step which may lead up to the prevention of gall-stones or late gall-tract pathology, due to its ability to recognize these conditions in their incipiency.

II. NON-SURGICAL DRAINAGE OF THE GALL TRACT—A NEW METHOD OF TREATMENT.

Four years ago, at a meeting of this organization, the writer presented a paper covering his diagnostic experiences with this new method of non-surgical drainage of the gall-tract, which he had introduced three years earlier. Since then a larger experience has been accumulated in regard to its therapeutic effectiveness.

This method has been praised and criticized. Speaking generally, the criticism has come from doctors whose practical experience with the method has not been large and who have shown a tendency to disregard both the necessary thoroughness and the fundamental technical principles of its performance.

What is needed now is to harmonize certain existing discordant views. The surgeon, particularly, must grasp a more thorough knowledge of the usefulness of this procedure and aid his ability to cure his patient by utilizing it both preoperatively and postoperatively.

The author has repeatedly pointed out the limitations of this method. It cannot excise pathological tissue, safely remove gall-stones, or release adhesions. It can, however, materially aid the surgeon in the diagnosis of these conditions, and can prepare the operative field with increased safety to the patient. When the cystic duct is patulous, it can drain the gall-bladder efficiently. After removal of the gall-bladder, in the event of surgical relapse, it can, in most cases, drain the gall-ducts better by way of the duodenum, and with less risk to the patient. Many cases who have had multiple gall-tract operations, and for whom all surgical resources have been exhausted, have been restored to health by utilizing this method.

In states of early gall-tract disease, its therapeutic success without surgery has been large. Many brilliant results have been secured. Its range of usefulness in many conditions involving the gall-tract and associated viscera is very great. This need not be enlarged upon.

Many cases require primary surgery and nothing else. Many others should not and need not ever be operated upon, and will recover health by the use of non-surgical measures alone. Too often cases are operated upon without sufficient diagnostic justification and by the inexperienced surgeon. Too often thoroughly indicated primary operations, competently performed, become subsequent failures due to imperfect follow-up postoperative management, which encourages a preventable relapse and leads up to multiple operations and produces much post-surgical invalidism. Too often entirely unscientific dietaries and injudicious oral therapy, thoughtlessly prescribed, have permitted early gall-tract disease to stealthily develop into advanced pathology at a stage when it can be cured by a proper com-

*For amplification of this and following statements, the reader is referred to the monograph, "Non-Surgical Drainage of the Gall Tract," published by Lea and Febiger, 1923.

bination of practical procedures based upon a sounder diagnostic conception of the case. These are the facts.

To advance this subject further, what we need now is a broader understanding of our individual and mutual efforts of attacking the problem. We should develop better team work. We should put an end to our needless controversies, an end to splitting of scientific hairs, and evince a better "get-together" spirit, in the interests of suffering humanity, our common patients, who turn to us in their trouble.

III. THE PAPER IN ABSTRACT.

The writer has here assembled a partial analysis of his personal *therapeutic* experiences with the use of this method of non-surgical drainage of the gall-tract on a series of 536 gall-tract cases occurring in his private practice during the last five years, which offer many striking comparisons. Surgical successes are contrasted with non-surgical failures and *vice versa*. Surgical failures, without associated non-surgical management, are contrasted with surgical failures turned into successes by the use of follow-up non-surgical management. Surgical postoperative complications have been observed in a series of cases personally studied one to ten years after operations. Surgical mortality and surgical postoperative complications observed in a personally studied group of patients, personally referred for surgery, are compared with another group of closely parallel cases personally studied and treated by non-surgical management. Surgical postoperative complications and sequelæ in another series referred to the writer, after primary—often multiple—surgery, were analyzed. The possibilities of treating disease of the liver are considered. Nature's spontaneous arrest of gall-tract disease without any treatment is considered. Many types of disease treated with partial or complete success have not been included in the case discussions for lack of space—such as arthritis, pernicious anemia, catarrhal jaundice, empyema, impacted common duct stone, etc.

IV. STATISTICAL REVIEW OF 376 CASES TREATED SURGICALLY AND NON-SURGICALLY.

Of the 536 cases reviewed, 160, or 30 per cent, were referred for diagnosis only, and were treated elsewhere either surgically or otherwise. Of these the writer has no follow-up record.

Three hundred and seventy-six cases were personally treated non-surgically by drainage, combined autogenous vaccines, colonic irrigation, selective dieting, and a minimal use of oral therapy. As a preliminary, all recognized and removable foci of infection were eradicated. This is highly important.

Of these 376 cases, thirty per cent were cured, in the sense that they have all gone symptom-free for a period of one to four years, and their objective findings of catarrh, inflammation, or infection have been eradicated.

Fifty-one and eight-tenths per cent have been so much improved as to resume their former occupations and discard further active treatment and still remain well for periods longer than one year.

Nine per cent have secured approximately fifty per cent improvement, but *all* of this group represent cases of chronic illness of many years' duration.

Two per cent were entirely unimproved when last seen.

Only one patient, or 0.2 per cent, died—a woman of sixty-nine, who died of heart failure between her third and fourth treatment.

Seven per cent of the total series could not be traced.

Among these 376 cases there were represented all grades of gall-tract disease from incipient to late pathology, with various complications.

Of the 536 cases, 96, or 18 per cent, were operated upon. Of these 96 cases, 52 had been operated prior to their reference to me. All of this series can be classified as surgical failures, partly due to persistent postoperative complications and partly due to bad choice of original operation, or fail-

ure to recognize a multiple lesion. The entire series were badly incapacitated. The operations done on this series were as follows:

Cholecystectomies	16	cases	30%
Cholecystostomies	24	"	46%
Appendectomies	37	"	61%
Gall-stones removed	17	"	32%
Adhesions released	7	"	13%
Gastroenterostomies	7	"	13%
Other abdominal operations	15	"	28%
Multiple operations	20	"	38%
Multiple operations on gall-tract	13	"	25%
Total number of operations on	52	cases	161
Total number of abdominal operations on	52	"	98

Of this series of 52 cases of previous surgical failures, 27 were treated entirely by non-surgical procedures of various kinds (drainage, colonic irrigation, physical therapy, vaccines, diet, and drugs), and the average total improvement secured was 83.6 per cent. Six cases could not be traced.

It was necessary for me to send 19 cases for further abdominal surgery, after a preliminary period of preparatory non-surgical drainage. Fourteen of the cases followed up by various non-surgical management secured 90 per cent improvement over their previous disability. Two cases are too recent to tabulate. One case could not be traced. Two cases died—a mortality of 10 per cent.

Of the total 96 cases operated upon, this second analysis concerns 58 cases personally studied preoperatively, and then personally referred for surgery. The operations done on this series, and their findings, were as follows:

Cholecystectomies	33	cases	57 %
Cholecystostomies	6	"	10 %
Cholecystoduodenostomies	2	"	3.5 %
Choledochostomies	2	"	3.5 %
Cholecystogastrostomy	1	"	1.8 %
Duodenoduodenostomy	1	"	1.8 %
Appendectomies (incidental)	13	"	22.4 %
Appendectomies alone	6	"	10 %
Gall-stones removed	19	"	32 %
Adhesions released	21	"	36 %
Gastroenterostomies	6	"	10 %
Pyloroplasties	2	"	3.5 %

Of these 58 cases, 50 were primarily gall-tract cases. Most of them represented late pathology, 19 of which had had previous operations on the gall-tract. Many were distinctly "bad-risk" patients. Forty per cent were given a preliminary period of non-surgical drainage with sufficient improvement to later justify surgery despite grave contraindications. The mortality was 10 per cent. Twenty-eight per cent required postoperative non-surgical drainage follow-up treatment to insure recovery from postoperative complications, chiefly due to residual duct catarrhs and infections, not eradicated by surgery alone. No other method can so well prevent postoperative cholangitis or hepatitis.

Within this series of 58 cases an average of 90-per-cent improvement over previous disability was secured, but 14 cases required postoperative non-surgical drainage to bring this about.

It is to be noted that cholecystectomies were done in 33 cases or 57 per cent, because the preoperative drainage study clearly indicated destroyed function of gall-bladder or cystic-duct obstruction due to adhesions. Unless some definite indication, preoperatively or operatively demonstrated, exists for removal of the gall-bladder, I have found that cholecystostomies will average quite as well, *provided* they are resurveyed by postoperative drainage study from time to time. By this means many gall-bladders still capable of good function can be saved, and thus avoid the need of correcting postoperative complications, such as diarrhea, nausea, and biliary vomiting, which follow cholecystectomies badly compensated.

Ninety-five per cent preoperative accuracy in diagnosis of infections, stones, adhesions or obstructed cystic ducts was confirmed by operative findings.

Among the 58 patients personally selected for upper right quadrant surgery, the writer finds that there occurred a mortality of 10 per cent, severe postoperative complications without hospital death occurred in 33 per cent, and satisfactory postoperative recoveries in 57 per cent.

Dividing these first two groups into classes, the surgical deaths are made up as follows:

V. ANALYSIS OF SURGICAL DEATHS WITH POSTOPERATIVE COMPLICATIONS.

Class A.

1. Case No. 981, female, aged 44. Thirty-two hours after a cholecystectomy died from doubtful cause, said to be either acute uremia or cerebral embolus. This patient was a most favorable operative risk with excellent heart and preoperative kidney findings. Minimum surgical trauma, gall-bladder very expertly removed. Her death was a genuine surgical catastrophe, inasmuch as neither her disabilities nor the operative findings justified surgical intervention.

2. Case No. 1009, female, aged 35. Died of peritonitis four days after duodenoduodenostomy. At this third operation a mass of adhesions was found between the bed of the gall-bladder and pyloroduodenal limb. Stomach in torsion and anterior wall adherent to surface of liver.

Seven years previously a cholecystostomy was performed with removal of stone from cystic duct and many stones from gall-bladder, with eighteen days of surgical drainage. Appendix also removed. Return of symptoms after three months. Six years later non-surgical drainage and vaccines failed to relieve her and a cholecystectomy was performed. Seven weeks later persistent biliary vomiting, upper right quadrant pain, and griping diarrhea. Postoperative non-surgical drainage gave considerable relief until the development of the pyloric obstruction due to adhesions.

3. Case No. 1037, male, aged 58. This generally "bad risk," moderately jaundiced patient was operated November 9, 1920. Gall-bladder filled with stones, removed with difficulty due to adhesions—choledochostomy. Ten days following operation the patient became markedly jaundiced, which cleared in a week. On December 20 the jaundice returned with clay stools, and he was reoperated on December 27. Dense adhesions released, stricture of common duct found, duct partially dissected and reconstructed over rubber tube. He was discharged on February 14, 1921. He remained surgically well until March 6, 1922, when he again became jaundiced, and on March 23, 1922, he was again reoperated. Great difficulty was encountered at this operation in exposing the common duct. It was necessary to open the duodenum. Attempt was made to reconstruct the duct again over a rubber tube, but the operation was not successful. Obstructive symptoms continued, and on March 29, 1922, he was reoperated for the fourth time, and an attempt made to anastomose the hepatic duct with the duodenum. The operation was not completed due to the patient's condition, and the patient died an hour later. (Surgeon's epitomized notes.)

4. Case No. 1312, male, aged 54. Died on thirty-sixth day after gastroenterostomy. Postoperative persistent nausea and biliary vomiting. Bronchopneumonia (probably traceable to nursing carelessness). Double septic parotitis (probably the result of infected gums and tooth roots). Wound broke open and was found infected. General septicemia and meningismus.

5. Case No. 1351, male, aged 65. Died on the third day after a cholecystectomy and gastroenterostomy for duodenal ulcer. Gall-bladder thickened and covered by adhesions running to posterior surface of pyloric end of stomach. Cause of death postoperative pneumonia with deficient kidney function. This patient was a distinctly "bad risk," with late pathology.

6. Case No. 1476, male, aged 23 years. Died on the seventh day following appendectomy and cholecystectomy with cystic duct calculus. Postoperative complication was acute dilatation of stomach. This patient was a most favorable operative risk.

From the citation of the above cases, therefore, it will be seen that the mortality among this group personally selected from either the standpoint of urgent surgical necessities for whom all other measures of relief had failed, or selected as being exceptionally good surgical risks, is still high. Furthermore, none of these patients were operated upon by the occasional surgeon. In 95 per cent of the total series these pa-

tients were under the care of three abdominal surgeons of large experience, possessed of the highest operative skill.

VI. AVERAGE MORTALITY RATE IN GALL-TRACT SURGERY.

Mortality statistics in upper abdominal surgery show great variations, so that it is difficult to strike a reasonable average. In gall-tract surgery mortality statistics in recent years have varied from between 4.6 per cent and 20 per cent, as reported by surgical clinics of established reputation. As a rule the larger the series, the lower the mortality. For example, Crile,[1] reports that "among a total of 1235 operations upon the gall-bladder and gall-ducts, the mortality rate has been: Cholecystectomy, 2.5 per cent; cholecystostomy, 5.4 per cent. Although these figures make it appear that cholecystectomy is the safer operation, this is due to the fact that cholecystostomy is used in the 'bad-risk' cases." His average mortality in this series, therefore, is approximately 8 per cent.

Smithies,[2] in a series of 1000 analyzed cases, found nearly 6-per-cent mortality. Finkenheim,[3] in a series of 670 cases, reports a mortality of 91 cases, or 13.6 per cent, made up as follows: 24 from collapse and inanition, 18 from cardiac failure, 16 from pulmonary causes, 11 from peritonitis without perforation, 10 from peritonitis with perforation, 8 from clotting deficiencies in the blood, 2 from septicemia, 2 from cachexia. Cutler and Newton,[4] in a series of 25 cases, reported that five of them died before they left the hospital, a mortality of 20 per cent.

Omitting this last series, which is hardly fair in view of the small number of cases, and averaging the others, the mortality is 8 per cent, as representative of gall-tract surgery within the last half decade, with operations performed by experienced full-time surgeons. If statistics were gathered from all sources throughout the country, including the records of the part-time or inexperienced surgeon, the mortality rate would be much higher than 8 per cent.

VII. POST-SURGICAL COMPLICATIONS WITHOUT HOSPITAL DEATHS.

In an analysis of operated gall-tract cases, however, it is not alone the mortality risk which must be taken into consideration, but also the postoperative complications, which may not cause the death of the patient, but which may greatly jeopardize his life and damage his after health.

For instance, during January, 1924, a man of 47 (Case No. 1593) was referred, whose surgical protocol is as follows:

1917—Gastroenterostomy for duodenal ulcer, and appendectomy.

November 21, 1921—Reoperated for marginal ulcer by Roux-Y operation.

December 3, 1921—Adhesions separated. Lumen of pylorus closed. Gastrotomy done to determine patulosity of gastroenterostomy.

July 28, 1922—Adhesions released.

March 21, 1923—Adhesions again released and cholecystectomy.

September 10, 1923—Reoperated again for adhesions.

On January 11, 1924—*X*-ray report from the hospital in which all six operations had been done was as follows: "Stomach and duodenum much deformed by adhesions. Gastroenterostomy patulous, but first inch and a half of opposed jejunum is tortuous and narrowed. No barium passed through pylorus during examination. No crater of any ulcer demonstrated. Margin of new opening is too much distorted to permit of diagnosing a marginal ulcer without demonstrating an actual pocket of barium."

All six of these operations were done by one of the best abdominal surgeons in the United States. This patient is now a hopeless postsurgical cripple, suffering great abdominal pain, with nausea, vomiting, and cachexia, and has been totally incapacitated for two and a half years. At the present time his tonsils exude pus and he has extensive gingivitis with pyorrhea and bad teeth, the presumptive etiological factor concerned with his original ulcer in 1917, and totally ignored since then.

The writer has also recently seen a man

fifty years of age, who had had thirteen abdominal operations within the past ten years. For the last twenty-six months and at the present time he is still wearing abdominal bandages for a persistent fecal fistula.

Cases of this sort are well known to surgeons, as well as to internists, and yet rarely are included in the literature, thus giving a false impression.

VIII. ANALYSIS OF POST-SURGICAL COMPLICATIONS.

Class B.

Among the writer's series of personally referred cases which recovered from immediate operation, the following hospital complications took place:

Case No. 969, male, aged 42, first seen in 1920. Appendectomy with exploration of upper right quadrant on December 11, 1922. Secondary infection, incisional hernia, 29 days in hospital, slow posthospital convalescence of two months. Present condition excellent.

Case No. 1179, male, aged 29, first seen in June, 1921. Operated in January, 1922, with cholecystectomy and appendectomy. Postoperative ether bronchitis. On the fourteenth day the wound broke down and two months later still had incisional discharge. Present condition good.

Case No. 1412, female, aged 44, first seen in September, 1922. Appendectomy and upper right quadrant exploration in April, 1923. Penumonia, secondary infection. Forty days in hospital; slow posthospital convalescence. Present condition—complaining of most of her original symptoms.

This patient, by preoperative non-surgical drainage study, gave distinct evidence of a subacute cholecystitis, which was not demonstrable to the operating surgeon, who found the gall-bladder apparently normal, and who was inclined to believe that the appendix was solely responsible for the patient's symptoms. The follow-up results do not tend to justify or confirm this opinion.

Case No. 1499, female, aged 37. Operated in May, 1923. Cholecystostomy, removal of over 200 gall-stones, release of adhesions. Patient developed an immediate biliary fistula, which has persisted for one year. Postoperative drainage in October, 1923, found swab culture from sinus of staphylococcus aureus, and culture from bile drainage, staphylococcus aureus and non-hemolytic streptococcus, the same infection as was demonstrated preoperatively. This patient is in good health at present writing, notwithstanding the persistent fistula, and has not reported back for further observation, although postoperative non-surgical drainage together with the use of vaccines has been urged, inasmuch as the use of this plan has been successful in closing such fistulas in several cases within the writer's experience.

Case No. 1560, male, aged 51. Operated in November, 1923. Cholecystectomy, appendectomy, removal of four stones in gall-bladder, release of adhesions. Developed secondary infection about fifth day, necessitating reopening of six-inch wound to peritoneum. Perihepatitis, subdiaphragmatic collection, with inflammatory exudate passing through diaphragm and immobilizing base of right lung by adhesions. Extremely stormy postoperative recovery with septic temperature for weeks. In hospital sixty-one days, with posthospital slow convalescence of three months. Present condition quite satisfactory, although no postoperative study has yet been made.

If this patient had not been an exceptionally good risk from the standpoint of heart and kidneys, he would certainly have died. Furthermore, he was selected for operation only because of *x*-ray evidence of quiescent gall-stones and chronic appendicitis, although complaining of absolutely no disturbances in digestion, notwithstanding achylia gastrica and somewhat damaged pancreatic function. He was a case of progressive osteoarthritis, slowly developing over twelve years, with all extra-abdominal foci of tonsils and teeth removed, without effect. Abdominal surgery was urged on the ground that the

appendix and gall-bladder might be abdominal foci contributing to the progress of his arthritis.

At present writing it is impossible yet to say what effect in end results this operation may secure in regard to the arthritis. To attain this end, although not yet secured, his life was greatly jeopardized, and his case serves as an illustration of the difficulty in prognosing the surgical risk, even in an unusually "good-risk" patient.

Case No. 1308, female, aged 69. First seen in April, 1922. Had been operated in July, 1921, with cholecystectomy, release of dense adhesions and appendectomy for attacks of severe upper abdominal colic. Normal postoperative recovery until October, 1921, when severe colic recurred. During the next six months four severe attacks with jaundice and diarrhea, but no chills or fever. Non-surgical drainage found complete common-duct obstruction, which failed to reopen under magnesium sulphate and hot solutions, and failed to relieve pain. Reoperation in April, 1922, disclosed dense adhesions between stomach and liver in exactly same position as at previous operation, only more dense. Common duct exposed with difficulty, found dilated and containing a non-faceted stone approximately one-half inch long. Stone removed, probe passed without any obstruction into hepatic duct and into duodenum. From the appearance of the stone and its density, the surgeon felt that it had been present at her previous operation, but lurking in the hepatic duct where it escaped recognition.

IX. NON-SURGICAL DRAINAGE IN COMMON-DUCT OBSTRUCTION.

Discussion.—This case illustrates an instance of failure of non-surgical drainage to relieve a common-duct obstruction due to impacted stone in a jaundiced, elderly, "bad-risk" patient. However, in several similar cases of common-duct stone obstruction this procedure has proved splendidly successful. The magnesium sulphate has relaxed a spastic duct sphincter, with its associated inflammatory edema, and has thereby allowed the impacted stone to bob back into a (usually) dilated common duct. This then permits of preoperative non-surgical drainage of the dammed up bile and inflammatory products. As much as five or six gallons of bile have been removed from the body within two weeks or less. This rapidly clears the jaundice, shortens blood coagulation time, and detoxicates the patient with resultant improvement in laboring heart and kidney function, thus lessening the surgical risk. Therefore, in many such cases the use of this method will be both an aid to the surgeon, and of great value to the patient, and wherever possible should be attempted for a reasonable length of time in a patient with common-duct obstruction.

Certain cases with acute colic attacks, and complete obstructive jaundice, and "bad risks," also successfully prepared in this way for operation, have apparently been due to obstructions other than stones, since no calculi were demonstrated under closest inspection, and the patients have not relapsed following surgery. Sometimes it is inferentially due to a swollen, hardened head of pancreas, which, however, hardly explains the colic-like pain. Where the gall-bladder still remains it has seemed suggestive that the attacks of colic might be produced by simultaneous contraction of gall-bladder and spasm of sphincter, with rise of intraduct tension acting on acutely inflamed mucosal surfaces, as the writer has published elsewhere,* for no operative findings were demonstrable which would so well account for this phenomenon.

X. GOOD JUDGMENT REQUIRED IN SELECTION OF PATIENTS FOR THERAPEUTIC USE OF METHOD.

Although I urge a trial of non-surgical drainage as a preliminary to operation on jaundiced patients with complete obstruction, except where produced by simple catarrh (a condition which can be nicely

Cf. Case Report No. 23, p. 572, Non-surgical Drainage of the Gall Tract. (Lea and Febiger.)

cured in half the average time by non-surgical drainage alone, thus protecting the liver and pancreas), good judgment should be used as to how long such a procedure must be persisted in before deciding that it is ineffectual. In a general sense, keen consideration should be given to the age and feebleness of the patient, and whether or not serious surgical contraindications exist, especially in the cardio-circulatory-renal systems. Sometimes one must come to a prompt conclusion as to what to do, bearing in mind the somewhat rare occurrence of carcinoma of the papilla of Vater or of the bile duct as a possibility.

This was recently demonstrated in a patient of my series, a Jewess, Case No. 1617, 42 years of age, who was seen in March, 1924, who was acutely and deeply jaundiced, with nausea and anorexia, but absolutely no pain. She had had severe pyorrhea and thirteen abscessed teeth extracted five weeks previously. Recurrent tonsillitis, with last attack three weeks previously. Six months before she had had an acute urinary cystitis, now subsided. Two years ago she had marked urticaria, with itching, but no jaundice, which cleared in two weeks. In September, 1923, she had attacks of chills, low-grade fever, nausea, but no pain or vomiting, and only slight jaundice. This occurred off and on until November. One week prior her jaundice became very pronounced, of the greenish-bronze type.

In view of the recent history of oral sepsis and painless jaundice, it was at first considered that the condition might be due to acute catarrh or recurrent cholangitis instead of pancreatic new growth. Non-surgical drainages were carried out on seven successive days, averaging four hours each, with complete obstruction noted on the first day. On the fourth day 100 cc of an intense blue-green-colored bile was recovered, apparently representing the actual color of her bile, inasmuch as no oxidation pigment changes could be accounted for by intermixture with gastric juice. Occult blood in this specimen was negative, as well as in seven daily specimens of duodenal fluid. On the fifth, sixth and seventh days only very faint bile-tinged fluid was recovered, with absence of the flocculi and cytological findings commonly recovered in acute catarrhal jaundice.

This patient was therefore referred for surgery, and at operation Dr. Deaver found the liver enlarged and somewhat fibrotic, with duodenum adherent to liver. Pancreas showed no gross pathology. The common duct was very small; there was no calculus obstruction. A small probe passed the papilla of Vater with difficulty due to obstruction from a neoplastic growth confined to the papilla or to a very limited area of the pancreas surrounding the termination of the common duct in the duodenum. The gall-bladder contained no stones and appeared only slightly diseased. A small T tube was put into the common duct and a cholecystoduodenostomy performed. Post-operative recovery thus far has been smooth, although jaundice still persists.

XI. CONTRAINDICATIONS FOR THERAPEUTIC USE OF NON-SURGICAL DRAINAGE.

It is obvious that non-surgical drainage could accomplish nothing in such a case. Unnecessary delay in judgment here is dangerous.

Similarly, in patients with obstructive jaundice due to pancreatic new growth, non-surgical drainage is likewise therapeutically ineffectual, and a prompt operative decision should be reached, as demonstrated by the following case recently seen:

Case No. 1616, male, aged 70, seen on March 13, 1924, with intense jaundice, itching and anorexia and bitter taste, but no pain, nausea, or vomiting. Patient quite toxic. No previous digestive disturbances. Last summer noticed that he was yellow, but jaundice cleared up in ten days, but recurred three weeks ago, and has been progressively deepening since. Two weeks ago had diarrhea for two days.

Duodenal intubation determined complete biliary obstruction, and frank bleeding within the duodenum. Tube immediately withdrawn.

Diagnostic impression lay between active

duodenal ulcer versus carcinoma at pylorus, with inflammatory edema obstruction, common duct or pancreatic new growth ulcerating through into duodenum. *X*-ray study failed to reveal any upper right quadrant pathology beyond the suggestion of a small diverticulum in the descending duodenum, and a tendency to duodenal kinking near the cap.

Operation by Dr. Despard, on March 22, 1924, exposed a large, distended gall-bladder with dilated common duct size of thumb. No evidence of stone obstruction. In the head of the pancreas there was a nodule the size of a walnut, of irregular shape and very hard, but without enlargement of other portions of the pancreas. This mass was adherent to the posterior wall of the duodenum and apparently ulcerating through. No evidence of malignancy anywhere else. Liver reddish-gray with cirrhotic areas of connective tissue. This patient was a bad risk from standpoint of age, heart muscle, and kidneys, and highly toxic. Dr. Despard very wisely made no attempt to excise the mass, but did a cholecystogastrostomy, and the patient left the table with a minimum of surgical and anesthetic shock. A smooth postoperative recovery followed with prompt clearance of jaundice, and at present writing the prospects for this patient appear reasonably favorable.

This latter point of view is expressed because last September another patient, Case No. 1556, 68 years of age, with a very similar history, and practically identical findings, was operated by Dr. Deaver, who did a cholecystoduodenostomy, which was followed by a smooth recovery, and seven months later this patient remains in exceptional health. Postoperative drainage study shows excellent function of the cholecystoduodenostomy, although pancreatic efficiency is greatly diminished in trypsin and deficient in steapsin. This has been compensated for by a fat and meat and sugar-free diet, and the use of pancreatic substitutive products. A number of other cases could be cited if space permitted.

Case No. 953. Four years ago a lady of fifty-five years was seen and her case studied. Her general appearance was representative of a type of chronic gall-tract disease, associated with hepatic-intestinal toxemia. Tired, drawn facies, with very pronounced swarthy pigmentation of skin, accompanied by many pigmented moles and petechiæ. Heart muscle weak; marked hypotension; lack of endurance and dizziness; persistent and often intense nausea with dry retching; right sciatic neuritis; pronounced constipation with laxative and enema habits.

For twenty years this patient had had intermittent attacks of acute abdominal pain about twice a year, coming without warning in usually the late afternoon or evening, lasting three or four hours, and followed by abdominal soreness, which localized usually in the lower right quadrant. The pain was a steady ache, not colicky, not referred to back or shoulders, and not accompanied by nausea or vomiting. Her last attack six months prior to examination was much more severe, and somewhat different, coming on gradually over a period of eight to twelve hours, culminating in very severe upper right quadrant, pain, coming in spasms for about four hours, relieved by bed rest, ice-bag, and morphine. This attack ended abruptly with a sensation of something giving way under the right ribs. No jaundice, no vomiting, but nausea and dry retching and some residual soreness in the upper right quadrant, but none in the right iliac fossa.

A study of the upper right quadrant by the duodenal tube showed an intense exfoliative gastroduodenitis with negative bleeding in duodenum and stools, and a normal gastric acidity. Gall-tract drainage recovered a definitely pathological green-black, turbid bile, with +4 mucopurulent flocculi microscopically showing evidence of infection and pronounced inflammatory elements, all heavily bile-stained, but no suggestion of lithiasis, formed or potential, or evidence of cystic duct obstruction. Gall-tract cultures recovered heavy and pure growth of staphylococcus aureus.

X-ray study by Dr. Manges showed a

gastric deformity, suggesting perigastric adhesions and a large pathological gall-bladder.

A surgical consultation was held and the patient considered a good operative risk, but in view of the fact that the cystic duct was not obstructed and gall-bladder drainages easily secured, it was decided to give non-surgical management a trial.

This patient was therefore given 26 biliary tract drainages between March 9 and November 18, 1920, with progressive subjective improvement and gradual disappearance of inflammatory objective findings and pathological bile cleared to within normal limits. During this period her diet was restricted in fats, eggs, and animal proteins, and she was given a full course of autogenous vaccine administration with focalizing reaction referred to upper right quadrant during early injections. She was given no medicines.

She was then discharged from office treatment and was advised to carry on her drainages at home at intervals of three to five weeks, having become entirely proficient in the procedure.

During the next three years her replies to follow-up letters were enthusiastically favorable, but I did not personally see her again until at a dinner party in December, 1923. I was greatly surprised at her improved appearance. She looked ten years younger, the old deep swarthy pigmentation had disappeared, and her color was excellent. She stated that she had improved in every particular, was entirely well symptomatically, had regained 11 pounds of lost weight, and was going about a good deal at dinner and dancing parties, and was able to eat and drink whatever she pleased without any distress. She stated that she had voluntarily kept up her home drainages at intervals of four to six weeks with very satisfactory results.

I had felt that this case would unquestionably require surgery before this time and was entirely unprepared for such an excellent report. It was suggested to this patient that she come in for a recheck examination, both by clinical and *x*-ray studies, but she has not yet done so. It would be interesting to compare the present findings with the former evidence. Nevertheless, the clinical recovery has been as good as would have followed surgical intervention.

Discussion.—I am, therefore, more disposed to treat patients with this type of cholecystodochitis associated with gastroduodenal catarrhs, and especially patients of this age, by this plan of technical and topical non-surgical management, rather than to insist that they be operated upon. In other words, to give them every chance of avoiding even the 8-per-cent surgical mortality risk.

Case No. 1286, a woman, 48 years of age, was first seen in February, 1922. She had been confined to her bed for eight months. Two months previously she had had her appendix, both ovaries and uterus removed. At this operation the stomach and gall-bladder were stated to be normal. For one year she had been steadily growing weaker, gradually losing 44 pounds in twelve months. For two weeks she had had severe cramp-like epigastric pain after eating, lasting one to two hours, requiring morphine injections once or twice each day to control it.

Brought in as a litter case, she was alarmingly weak, weighing 94 pounds, her ideal calculated weight being 158 pounds. Skin very sallow, marked emaciation, breath foul, postnasal mucus, gums inflamed and puffy, numerous aphthæ. Extreme type of congenital visceroptosis with usual stigmata.

Urine showed albumin with hyaline casts, low specific gravity, marked indican, phthalein 46 per cent. Enterocolitic stools. Drainage findings showed infective exfoliative cholecystodochitis with staphylococcus aureus and B. coli. "B" fraction very static. Liver functional test showed deficient elimination.

Diagnosis: Visceroptosis and disseminated infection of gastrointestinal tract—gums, gall-tract, and enterocolon. Hepatic-intestinal toxemia, beginning hepatic cirrhosis. Renal subfunction and inflammation (toxic?).

Preliminary treatment: Visceroptotic rest-cure management for six weeks, with abdominal support. Forced feeding, care of gums, bromides, belladonna, taka-diastase. Later tonics and bacillus acidophilus milk.

Progress: After two months marked initial improvement. Pain free, distress lessening, digestive functions improved, but no gain in weight. By May she was considered well enough to begin therapeutic biliary tract drainage, followed by transduodenal lavage. From May, 1922, until present writing she has been given 41 drainages, beginning at weekly intervals, extending to two weeks, and for the last sixteen months once a month. During this period she has gained 70 pounds and at present weighs 164. She is perfectly well, and is able to do whatever she pleases. Her skin is clear, with fine complexion, strength and endurance excellent, all functions perfectly satisfactory. Drainage findings normal. Her total recovery is really brilliant.

Discussion.—This case illustrates what can be accomplished by a combination of practical methods in disseminated infection of the gastrointestinal tract, associated with severe hepatic-intestinal toxemia in the very asthenic visceroptotic. Long-continued treatment must be carried out in order to secure maximum results, which have been uniformly good in a large number of similar cases.

XII. NATURE'S SPONTANEOUS ARREST OF GALL-TRACT DISEASE.

Case No. 637. Eight years ago the writer saw a lady fifty-four years old through several severe attacks of nocturnal colic of clinically undoubted gall-stone type. This patient was of the apoplectic habitus and very obese as to abdomen and thorax. The attacks came at increasingly frequent intervals over a period of several months, all occurring between 10 P.M. and 2 A.M., agonizing upper right quadrant pain with muscle spasm, rigidity and localizing tenderness over gall-bladder region, followed by nausea and biliary vomiting, which, together with morphine, tended to end each individual attack. Moderate leucocytosis averaging 12,000. *X*-ray study by Dr. Manges demonstrated pathological gall-bladder with suggestion of negative shadow stones and upper right quadrant adhesions. Blood cholesterol 250 mg. per 100 cc. Heart muscle bad and kidney function depreciated.

After several such attacks surgical consultation with Dr. Deaver was held and operation strongly urged for the purpose of removing gall-stones and pathological gall-bladder and preventing further attacks, which were wearing down the cardiac strength of this patient. Operation was declined in July, 1916.

Since that time this patient has never had another attack. She is in far better health at sixty-two. Her heart muscle has improved and her kidney function grown no worse, notwithstanding the fact that she does everything that a patient with lithiac cholecystitis should not do—cocktails, rich diet, dancing, and so on. To-day I see this patient quite often. She has taken no medicine in years and is behaving quite as any normal individual possessed of good health.

It is well for us to remember in prognosing such cases as this that nature has great possibilities of furnishing spontaneous arrest in restless cholelithiasis. Gall-stones of themselves rarely kill. Unless the gall-bladder itself is seriously infected, many patients may recover without any medical or surgical care. Especially is this true if a thickened gall-bladder is contracted so tightly around its contained gall-stones or when associated with an obstructed cystic duct due to adhesions or atresia, so that there is less chance for restless movement of the calculi. The larger the stone the less likelihood of colic attacks due to cystic duct transit.

(To be concluded.)

Non-surgical Biliary Drainage and the Cathartic Action of Magnesium Sulphate[1]

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Since the general discussion of the diagnostic value of the Meltzer-Lyon biliary drainage began to occupy our attention, clinicians have seemed to overlook the value of duodenal lavage with saline cathartics in the treatment of chronic intestinal stasis and accompanying disorders. At the meeting of the American Therapeutic Society in 1918 I had occasion to say, with reference to duodenal lavage and saline cathartics, that inasmuch as the intended clinical result, the removal of intestinal stasis, was fully assured by this method, its general adoption was hoped for in order that the combined observations of the profession in regard to incidental results in the improvement of other pathologic conditions might be used as a basis for formulating a therapy for an affection which had hitherto been more or less obscure. What we hoped for has not entirely come to pass, for it referred in the main to therapeusis. It has, however, been partially fulfilled; duodenal lavage has not only been generally adopted, but its results have been incidentally serviceable in then unexpected directions.

In my paper on "Treatment of Intestinal Stasis by Duodenal Lavage," presented to the above-named society at Richmond, Va., June 7, 1918, I said: "There has not been a single failure in any of my cases in regard to the clinical cure of intestinal stasis, and incidentally also of constipation, although the anatomic conditions of kinks and adhesions remain unchanged. From this positive fact several obvious conclusions may be drawn. The first is that kinks and bands, which, indeed, have been pronounced physiologic by some authors, are not necessarily the cause of intestinal stasis, and that, consequently, their surgical removal will not cure the stasis. Another conclusion is that any other pathologic condition, rheumatoid arthritis, gout, functional disorders of the heart, arteriosclerosis, epilepsy, asthma, cirrhosis of the liver, primary and secondary anemia, skin diseases, catarrhal inflammation of the mucous membranes, eye diseases, neuralgia, neuritis, insomnia, neurasthenia, melancholia, dementia, and insanity, should disappear after successful duodenal lavage treatment, if these conditions are really caused by intestinal stasis; and if they do not disappear after the supposed causative factor has been removed, it follows that the etiology requires correction, that these conditions were not after all due to intestinal stasis."

The remarkable contribution by Meltzer at about the same time I was writing on this subject, and the painstaking contributions of Lyon and others since that time, have brought the subject into the foreground of current discussion, and promise even better things than I could possibly have divined from the exclusively clinical point of view which I held and still hold.

In my paper I called attention to the value of duodenal lavage with saline cathartics in chronic intestinal stasis, and took occasion to advert to the fact that it was possible by the clearing of the bowel, even in the case of a stasis associated with obstipation, to assist in the recovery of many such cases without surgical intervention. This happy outlook was urged at a time when Lane's kinks, bands and adhesions occupied the center of the stage in therapeutic discussions; and I believed, as I still do, that duodenal lavage with saline cathartics restores normal physiology, and that the compensation which then takes place excludes surgical intervention.

Much has been said of the *obiter dicta* of Meltzer, expressed in his foot-note to an article published by the Rockefeller Institute, in which he says that magnesium sul-

[1]Read before the American Therapeutic Society, Toronto, Canada, June 6 and 7, 1924.

phate administered by the duodenal tube relaxes the sphincter of the common duct in the duodenum and permits ejection of the bile, and declares that this procedure might be developed into a practical, useful method. His "contrary innervation" has been generally adopted as a physiologic law, but it should not be forgotten that his interest in it, by way of discovery as well as application, lay primarily in its employment as "a practical, useful method," as he tersely says. The scientific detailed elaboration of non-surgical drainage of the biliary tract, for which we are indebted to Lyon, is a great aid in diagnosis, and as such deserves respectful attention, but it has not led us far in therapeusis. In fact, biliary drainage, achieved with much care and discrimination, does not dispose of the fact that magnesium sulphate is a cathartic, that this drug is not completely withdrawn through the duodenal tube, but a large quantity is left in the duodenum and much of it is carried down into the intestine. Is it not possible that the clinical results reported are due to the cathartic action of the magnesium sulphate? Lyon conceded this in his summing up of the clinical possibilities.

The withdrawal of fractional bile from the hepatic duct, the gall-bladder and the biliary ducts is interesting and has proved to be of great diagnostic value, but I should like to urge that in the employment of cathartic salines with the duodenal tube one cannot be sure that the aspiration removes all the magnesium sulphate and that there may not be a continuation of the biliary drainage and the cathartic action which carries off the intestinal material, thus practically relieving the associated intestinal stasis. In view of the enlarged significance the duodenal tube has acquired by reason of its aid in diagnosis and treatment, it must not be overlooked that the magnesium sulphate induces a discharge of bile so large in quantity that it goes beyond the aspiration point. The magnesium sulphate acting as a cathartic clears the intestine, removing the fecal masses. I content myself with calling attention to this fact, without wishing in any way to derogate from the credit due to Lyon and his coworker. I have said: "In duodenal lavage with a solution of magnesium sulphate we have a method for the relief of biliary stasis, the forerunner of cholecystitis and cholelithiasis, and also a rational treatment for these diseases if they are present." This referred not to the diagnosis, but to the therapeusis, for I believe that the administration of the magnesium sulphate is in itself sufficient, beyond the furnishing of specimens for microscopic and bacteriologic analysis, to drain the biliary ducts and remove the intestinal toxins that are present, and so relieve the toxemia, thus affording the occasion for autonomous rehabilitation.

I wish to report a few representative cases, with gratifying results, treated as outlined in my former paper.[1] Briefly, the treatment consists of introducing through the duodenal tube directly into the duodenum a solution of 30 grammes of magnesium sulphate and 60 grammes of sodium sulphate in a liter of water. The lavage is given daily for ten days, as a first series of applications, then on alternate days for another ten days; the third series follows at an interval of three days, the number of treatments given in this last series being only three or four. Although by this time success is fairly certain, I have made it a practice to continue with one lavage a week until recovery is fully established. There are no unpleasant by-effects, and patients will tolerate the treatment for any length of time without discomfort.

Mr. O., aged 52, was referred to me May 28, 1918, for chronic intestinal stasis. His father was accidentally killed; his mother died of paralysis at the age of 63; one sister died of tuberculosis, another of carcinoma of the uterus. Seventeen years ago he had pains in the right foot, and he has had pains all through his body ever since. Seven years ago his right hip was involved, and three years ago the left hip. For the relief

[1]Charles D. Aaron: Treatment of Intestinal Stasis by Duodenal Lavage. *Medical Record*, August 17, 1918.

of this arthritis he had a tonsillectomy and several teeth extracted. A Roentgen-ray examination shows 128-hour intestinal stasis. Between May 29, 1918, and July 5, 1918, he has had seventeen treatments. Report of the roentgenologist July 8, 1918, states that twenty-four hours after the administration of barium there is only a small quantity in the cecum, indicating a mild cecal stasis. The patient was greatly benefited.

Mrs. B., aged 46, was referred to me April 27, 1918. She reported that she had had two operations, the first for ovarian cysts and appendicitis, and the second for removal of parts of the ovaries, separation of adhesions, and correction of a retroversion. Since the first operation, eight years ago, she has had continuous pain in the right abdomen. Upon physical examination a large indurated mass is readily palpable, and painful on pressure. A Roentgen-ray examination shows that a stump of the appendix was left after the operation—in all probability the cause of her present condition. The patient refused surgical assistance, and I gave her a duodenal lavage. From May 15, 1918, to July 10, 1918, she has had fourteen treatments. Improvement showed itself at once. After the fourth treatment the induration had entirely subsided, and she had no more pain or discomfort. The patient made an uneventful recovery. I was very anxious for another Roentgen-ray report, to ascertain what became of the stump. The patient was so much better that she did not wish to submit to another examination. On December 5, 1918, I succeeded in securing another Roentgen-ray examination. To my surprise the report stated that the stump was the same as described in the former report.

Miss M., aged 45, was referred to me for high blood-pressure. The apex impulse of the heart was felt in the fifth space. The action was rapid, and the sounds were of good quality. The systolic pressure was 170, diastolic 110. The patient was much troubled with dyspnea and epigastric distress. Beyond the fact that any exertion produced angina-like pains, the history was negative. The urine was normal. Assuming that the intestinal toxemia caused the high blood-pressure, she was given forty-five treatments of duodenal lavage between January 17, 1917, and June 10, 1918. The blood-pressure decreased from the beginning. April 1, 1918, the systolic blood-pressure was 152 and the diastolic 100. It should be noticed that the diastolic pressure remained practically unchanged. The patient, however, is clinically very much improved.

Mr. G., aged 61, consulted me for distress in the right hypochondrium. At times the pain was so severe as to suggest gall-stone colic. This condition continued for several months. He had sour eructations, heaviness after eating, and a soreness on the right side shooting into the left shoulder. There was great pain from deep palpation over the gall-bladder, and he had all the symptoms of cholecystitis. He was given seventy-five treatments between October 1, 1917, and October 17, 1919. He improved from the first, and is now in better health than for a great many years.

Miss M., aged 47, consulted me for frequent attacks of severe frontal headache. She has been constipated since childhood; suffered several years with melancholia and nervous depression. On physical examination she was found to have a pronounced gastroenteroptosis, for which an abdominal bandage was fitted. Between January 23, 1917, and February 12, 1919, she was given twenty-five treatments. She now rarely has headache, feels strong, and is greatly improved.

Mr. Y. consulted me for pain in the right hypochondrium. Four years previously he had had an appendectomy, and 300 gall-stones were removed from his gall-bladder. He had gastric distress an hour after meals, had eructations of gas, the bowels were very much constipated, and he slept poorly. A Roentgen-ray examination shows a chronic stasis due to intestinal adhesions. He was given forty-two treatments from October 18, 1918, to March

14, 1919. Since then he has been quite well.

Mrs. R., aged 54, was referred to me for repeated attacks of urticaria. Indigestion, from which she had suffered periodically for several years, had been relieved by an appendectomy in 1919; the appendix was 5½ inches long and was wound around the cecum, the tip being adherent to the posterior cecal wall. Her family physician had not given her any relief. At the suggestion of the consulting dermatologist, protein skin tests for foods were applied; there was some reaction to asparagus, beet, egg-white, Lima beans, and oats. These foods were eliminated from her diet, without any benefit, and she was given eighteen of the usual duodenal lavage treatments and responded quickly. She still has occasional attacks of urticaria, which quickly subside with one duodenal lavage.

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Factors Responsible for the Successful Treatment of Gall-bladder Disease[1]

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"The diseased gall-bladder belongs to the patient."

Trite and obvious as this oft-repeated statement of Kocher seems, there is still much discussion relative to gall-bladders that belong to the surgeon and gall-bladders that belong to the internist.

To elucidate this epigrammatic utterance Kocher appended the thought that if the patient with a diseased gall-bladder elects to go through life as a semi-invalid with the indigestion and pain which accompany this disease, or even endure with fortitude the occasional attacks of colic, then that patient should be made as comfortable as possible with drugs and sanatorium treatment; but if the patient elects, on the other hand, to be free from the symptoms, surgery should be resorted to, and the earlier the better.

Bad surgical results in these cases are due to two causes:

1. Operation at a late period when the surgery cannot be limited to the gall-bladder but must include the ducts.

2. Defective surgery, which may be due to no fault of the surgeon, but is incomplete owing to the poor physical condition of the patient.

[1]Read before the Newcastle County Society at Wilmington, Delaware.

DIAGNOSIS OF EARLY CHOLECYSTITIS.

The diagnosis of cholecystitis in its early stages depends almost entirely upon clinical findings, although I believe that we are sadly in need of laboratory methods which will aid us, and any new laboratory evidence is consequently rapidly seized by the profession.

However, it should be understood that any laboratory aid known at the present time is simply a cloak of mystery which should be tossed aside. It is a threadbare garment.

In 1919 Lyon propounded a relatively easy laboratory method for the diagnosis of disease of the biliary tract based upon the fact that magnesium sulphate relaxes the sphincter of Oddi, and by contrary enervation contractions of the gall-bladder took place. Meltzer had suggested that magnesium sulphate might cause relaxation of the sphincter of the common duct.

Many conflicting opinions and much experimental work ensued. Supporters of the method, as Sachs, Smithies, and Brown, were firm in the conviction that the method

was of value in the diagnosis and treatment of diseases of the gall-bladder and ducts. Other investigators, notably Fitz and Aldrich, Hartman, Dunn and Connell, Luckett and Lutz, Cutler and Newton, varied in their opinions from flatly condemning the method to being doubtful as to its practical application. Crohn asserts that Meltzer never claimed magnesium sulphate relaxed the sphincter of Oddi and caused contraction of the gall-bladder. Lyon's method depends upon physical cytologic and bacteriological studies made upon the bile obtained by the method which he has described. Dunn and Connell describe the same display of colors in the bile obtained from a patient deprived of the gall-bladder.

Studies conducted at the Mayo Clinic under Hartman have convinced him that it is impossible to sterilize the stomach, duodenum, or mouth, and they were able to grow bacteria from the mouth and those obtained by the tube in dextrose-brain broth to which had been added various strengths of the antiseptics recommended for cleansing and sterilizing the mouth, eosphagus, and stomach. They believe the principle of the process is false from a bacteriological point of view. Bile from a case of cholecystitis is often sterile because the infection and reaction are in the walls of the gall-bladder. Only in acute cholecystitis or in acute exacerbations of chronic cholecystitis are the bacteria present in the bile. Organisms were found in the bile in only 19 per cent of the gall-bladders removed at operation (Drennan).

All credit should be given Lyon for his sincere and stimulating work in this field, which has concentrated attention upon the physiologic study of the liver and pancreas, but it must be conceded by the warmest advocates of this method of diagnosis that the conclusions arrived at are only very general in the diagnosis of chronic cholecystitis.

At any rate the theory that infection of the gall-bladder is due to an ascending infection from the duodenum fails to explain the frequency of cholecystitis as a sequel to infection of the appendix. Hematogenous infection of the gall-bladder is, I believe, the most commonly accepted hypothesis, and infection of the liver through the portal vein, following appendicitis with consequent hepatitis setting up an infection of the gall-bladder through the lymphatics, is a most logical corollary.

We are forced to rely upon the time-honored clinical methods for a diagnosis. The patient cannot be sent off on a round of impersonal laboratory tests, nor can the physician shun individual responsibility.

A word should be said regarding *x*-rays in the diagnosis of gall-stones, and while some roentgenologists claim that they are able to demonstrate gall-stones frequently, other men of equal standing, notably Carmen, disagree with this claim. At any rate there are many diseased gall-bladders which do not contain stones.

In my own experience the *x*-ray has been of little value in the diagnosis of gall-bladder disease; it has, however, played a wonderful part in the extension of gastric surgery, and by demonstrating positive lesions in the stomach or duodenum has been of considerable value in aiding us to make a decision as to whether the indigestion was due to extrinsic causes or intrinsic disease of the stomach.

The reactions to an attack of cholecystitis are the systemic symptoms noted in any inflammatory process while the reflex symptoms are gastric. Appendicitis gives almost the same symptoms aside from the localizing evidence of the disease, but the two conditions occur so often together or in sequence that they may for all general purposes be considered as one disease.

What clinical signs are of any value in early cholecystitis? I firmly believe that there is certain clinical evidence which may be adduced that will definitely diagnose gall-bladder diseases.

Possibly these symptoms are so simple that the physician thinks them to be of no value. At any rate we know that patients are constantly treated as dyspeptics when

they have a typical syndrome of gall-bladder symptoms.

Do not wait until the patient is "fair, fat, and forty." It has been absolutely proved by Alvarez that fair, fat, and forty is just nineteen years after the gall-bladder should have been removed. Operation at this late period will warrant the more appropriate dictum "fair, fat, forty, and fatal."

The first point to determine is whether this patient has intrinsic or extrinsic disease of the stomach. If he has peptic ulcer, syphilis of the stomach, or gastric carcinoma, a carefully taken history together with fluoroscopic studies and possibly a gastric analysis will as a rule readily make a correct diagnosis.

If he has extrinsic disease of the stomach our first duty will be to exclude the gastric crises of tabes, which is easily done. If he complains that food easily satisfies him, or in other words that after sitting down to a well-cooked meal, expecting to enjoy himself, he suddenly pushes the chair back satisfied, we should then elicit the other symptoms of value.

If he finds that food which formerly agreed now disagrees, or if he does eat the meal he is suddenly and acutely nauseated, or in 15 to 30 minutes has sour regurgitations and belching with accumulations of gas in the stomach, *that patient has cholecystitis.*

To epitomize we may say that the symptoms are:

1. *Early satiety of food.*
2. Intolerance to food which formerly agreed.
3. Accumulation of gas, belching and sour regurgitation occurring in 15 to 30 minutes after this ingestion of food.
4. Sudden acute nausea and vomiting.

A little emphasis should be placed upon the time, 15 to 30 minutes, that food begins to disagree after it is ingested. Functional gastric disease causes distress immediately after a meal, and chronic appendicitis in two or three hours. Ulcer, of course, should be excluded.

If to the symptoms described we find localized tenderness indicating an inflammatory process, our diagnosis is certain. The colic of gall-stones, which is in reality inflammatory, can hardly be mistaken and needs no discussion.

It is well to remember that as the disease advances we may have involvment of other organs in the diseased process, with symptoms referable to them.

The gall-bladder, liver and pancreas are like three apples on a main stem, the common duct; when one rots the others rot, and the parasite most commonly causing the premature decay is the vermiform appendix.

The cure for a diseased gall-bladder lies in surgery, since the disease is in the walls of the gall-bladder, but as the physician sees these cases in all stages of involvement, the advice as to the time of operation, the method of preparation of the patient and the type of operation are matters of great importance if that patient is to be guided safely to recovery.

PREPARATION OF THE SEVERELY JAUNDICED PATIENT.

Recent advances made in the preparation of the jaundiced patient are extremely interesting.

The mortality rate is very high in this type of patient regardless of the skill and judgment of the surgeon, hence the careful preoperative care.

We are indebted to Walters for a careful study of the preparation of these patients, and he bases his conclusions upon the end results in thirty-four cases. The tendency is great for the jaundiced patient to develop fatal postoperative hemorrhage. In 1921 Bell and Walters presented a suggested régime based upon the fact that calcium chloride in small doses injected intravenously reduced the coagulation time of the blood to approximately normal limits in the majority of instances and prevented the occurrence of postoperative bleeding. This has been demonstrated experimentally by Lee and Vincent and clinically by Wright and Walters. Five cubic centimeters of a 10-per-cent solution of calcium chloride in

redistilled water is given intravenously daily for three days. Large quantities of carbohydrates are given by mouth and glucose solution by proctolysis in order to increase the supply of glycogen to the tissues of the jaundiced patient. Opie has shown this to be the needed food for toxic cases, and Mann has proved its value in patients with liver deficiency. Large quantities of water by mouth increase the body fluids and help to eliminate bile pigments. Hemostatic serum has apparently given good results in our hands, in increasing the coagulability of the blood, but the results have been variable. As a matter of fact we are working with variables, not constants, which is more or less confusing, since we have never been quite sure that the variation in the jaundice has not controlled the coagulability of the blood as much as the serum. The use of calcium chloride intravenously is founded upon scientific data proved experimentally and clinically in constant jaundice so that its adoption should be quite general in these instances of lowered coagulation time of the blood. I have adopted as a routine the exhibition of large quantities of carbohydrates and water by mouth with glucose solution by rectum, regarding it as a most important part of the preparation of the jaundiced patient for operation.

CHOICE OF OPERATION.

When the gall-bladder is diseased I believe removal to be the preferred method. Hence in our hands cholecystectomy is practiced where the disease is confined to the gall-bladder, and we are positive in the belief that recurrence of symptoms has been markedly lower than when we formerly performed cholecystostomy. I believe where the gall-bladder is removed easily, when bile does not spill over the field, and if hemorrhage is absolutely controlled, no drainage should be left in the peritoneal cavity. In fact, it has frequently been our custom to close these cases without drainage, and our results are better, in regard to postoperative recurrence of symptoms, than by any other method. If drainage is to be omitted it is not enough that the cystic artery, which bears the same relation to the cystic duct as a string to a bow, should be ligated; it is necessary that every bleeding point should be controlled. In other words, *your field should be so dry that it is dusty.*

Many masters of biliary surgery invariably leave in drainage. In observing these men work, there appears to be a very logical reason for this. The more experience a man has in surgery of the gall-bladder and ducts the more he will explore the ducts, which very often results in contamination of the operative field requiring drainage.

As we have said before, cholescystectomy is to be preferred where the disease is confined to the gall-bladder, but there are instances where cholecystectomy, while the preferred operation, is too dangerous. For instance, in the very fat patient with a high liver, where removal in the cavernous depths would endanger the patient's life; likewise in aged or weakened patients where the operative risk is great.

Surgical judgment founded on experience must be relied upon for decision in these patients, and I suppose the surgeon will always here, as elsewhere, at times decide upon a certain operation, and suddenly finding himself in a hand-to-hand conflict with hemorrhage regret that he did not perform the less radical operation. As experience increases, however, what we were once wont to look upon as a malign destiny assumes its humble place as an error in surgical judgment.

When the disease has advanced to the ducts with stone in the duct, cholecystostomy with drainage of the common duct is to be preferred. Who can foretell the amount of trouble resulting from infection of the ducts? All our bridges should not be burned behind us, and the gall-bladder should be preserved, because if removed and secondary operation becomes necessary, as is frequently the case, we will be forced to navigate an uncharted sea, and it is a difficult task to find the common duct by dead reckoning in a sea of adhesions. In

these cases rotation of the duct and incision through the adhesions down upon the stone has been my choice.

In some instances where we believe cholecystostomy to be the safer operation, we are forced to remove the gall-bladder because it is so gangrenous that it tears low down near the cystic duct while we are attempting to straighten the common duct out by traction for removal of a stone impacted in the terminal portion. In these cases we have been in the habit of splitting the gall-bladder and allowing the wall of the gall-bladder to remain where it is attached to the liver, removing the mucous membrane however. This prevents oozing from the liver and the opening up of fresh surfaces for absorption when pus is present in the gall-bladder.

Cholecystectomy is rarely indicated in severely jaundiced patients because removal results in hemorrhage from the liver at minute points which ordinarily would not bleed. This bleeding occurred as late as four weeks after operation in one of my cases; it finally resulted in the death of the patient. The liver should not be rotated from the wound where jaundice is present owing to the tearing of the edge of the liver with consequent oozing.

Cholecystostomy then, in our opinion, has a very distinct place in gall-bladder surgery, although we think cholecystectomy gives better results where the indications allow it to be performed.

CONCLUSIONS.

1. Cholecystitis should be recognized in its early stages, but we must still rely upon our old clinical methods.

2. The cure for a diseased gall-bladder lies in surgery.

3. The bad surgical risk due to severe jaundice should receive calcium chloride intravenously, and the assimilation of large quantities of water and carbohydrates before operation.

4. Cholecystectomy is the operation of choice when the disease is confined to the gall-bladder.

5. Cholecystostomy is to be preferred where the ducts are involved in the diseased process.

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Suggestions Regarding the Diagnosis of the More Common Organic Nervous Diseases

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The practical value of diagnosis in organic nervous diseases rests on its early application, and we shall consider it from that standpoint.

In brain tumor, headache is one of the earliest symptoms, and the fact that the headache may be intermittent and persist for some time with no positive physical findings must be borne in mind. We are tempted to look on the headache as functional in character, due to a severe migraine, a gastrointestinal disturbance, or some other toxic state. A close study of the history of the case may help us to suspect a new growth. A patient afflicted with severe paroxysmal headache, in June was thought to be a case of migraine, by November she was thought to have hysteria, which is not unusual complicating the symptoms of brain tumor, but by February she had all the classical signs of a cerebellar neoplasm, which was confirmed by an autopsy in April. In August a patient complained of having had headache, at times very troublesome, for several weeks. She had been working hard for a living, she had stood up against severe domestic and financial strain, and there seemed sufficient reason to think of a functional headache. Her physical examination was entirely negative except for a suspicious weakness of the arm and leg on one side, with a subjective numbness in the hand and foot. In four months the autopsy showed a tumor located at the foramen magnum.

When with the headache there is later the associated projectile vomiting and choked discs, it is easy to infer we are dealing with organic disease and probably a tumor of the brain. Its location is often difficult because of its presence in the so-called silent areas of the brain, or, because of increased intracranial pressure, symptoms are referred to other parts of the brain. If the lesion involves well-known areas, as the motor, sensory, or visual, the localization usually is not difficult and early diagnosis may be of great value in treatment. However, a patient with well-defined astereognosis and hemianopsia did not show the tumor on exposure of the parietal lobe or cuneus. Autopsy revealed the growth so deeply in the parietal lobe that it involved both sensory and visual fibers.

Ventriculography is often of great value in the localization of a brain tumor, though of some risk to the patient. The Barany test is of value especially in locating tumors in the cerebellopontine angle, but otherwise the interpretation of the findings may lead us astray in our diagnosis.

Early diagnosis of tumor of the spinal cord is of great value to the patient. Diagnosis after the case is one of well-developed paraplegia, with degeneration of the motor tracts, is of little practical value if, after successful removal of the growth, the patient cannot recover the use of his legs. A tumor of the cord must be differentiated from multiple sclerosis, from disease of the spine pressing on the cord, from degenerative lesions in the cord associated with pernicious anemia, from transverse myelitis, and from specific meningomyelitis. While multiple sclerosis may give a picture of localized cord lesion, complete examination will show symptoms of lesions elsewhere in the cerebrospinal axis. The blood picture will establish the diagnosis of pernicious anemia, though the rare case in which cord symptoms are the first to appear may render the diagnosis confusing for a time. Transverse myelitis, usually due to an infection, should show a temperature rise for at least a few days after the sudden onset of a paraplegia.

The laboratory tests with the history of the onset should establish the diagnosis of syphilis of the cord. X-ray examination

is of the greatest value in the elimination of disease of the vertebræ, tuberculous, malignant, or luetic, which, causing compression of the cord, may simulate closely the symptoms of tumor. A tumor in its relation to the cord may be intra- or extramedullary. In either case as it grows it creates pressure on the cord and symptoms due to this pressure. If the growth is within the cord, motor weakness and sensory loss may be the earliest signs of the lesion; if without the cord the first sign may be pain because of the irritation of the posterior nerve roots. The pain at first may be localized at the spine, but soon is referred along the course of the nerve trunks. A growth lateral to the cord may by pressure cause a partial Brown-Sequard sign. A growth anterior to the cord may present signs of pressure on the cord as first evidence of its existence. The study of the spinal fluid is most important. It is self-evident the Wassermann test of the spinal fluid should be negative. If the spinal cord is compressed the spinal fluid may show an excess of globulin and be of a light lemon color.

The early and exact location of the tumor is most necessary if the patient is to have a chance to receive benefit from surgery. The localization will depend on the symptoms produced by interference with the particular segment or segments of the cord involved by the growth, and the reference of the symptoms to the periphery as in disturbance of motion, sensation, nutrition, and sphincter control. We must remember our anatomy and not localize the growth too low in the cord.

In recent years the diagnosis of epidemic encephalitis has become important, and especially the early diagnosis of mild cases. As the disease is due to some infectious agent, and as the mildest cases are at times followed by chronic involvement of the basal ganglia, prompt and early recognition of the condition is essential if the patient is to be given the best chance for complete recovery. We all meet patients with the Parkinsonian syndrome in whom only the most painstaking history can develop early symptoms suggesting encephalitis. A patient received a slight wound above the eye. The physician who treated it considered it of no consequence. At the same time he believed the patient to have a mild attack of influenza. In one week the patient suffered from paralysis of accommodation as a plus three lens was needed for near vision. From this he gradually recovered. In six months he began to show muscular weakness and rigidity. In eighteen months he had a well-marked Parkinsonian syndrome. In reviewing the history it is evident the onset of epidemic encephalitis in this case was soon after the slight accident and the diagnosis of influenza was made. The patient, though not able to work, was in bed only a few days and did not have the best chance for recovery.

A woman, while shopping, was seized suddenly with vertigo and double vision. She went home and to bed. Her highest temperature was 99°. Her vertigo and double vision passed away in a few hours, but her prostration lasted for weeks, during which time she rested in bed. She eventually recovered with no sequelæ. The fully developed, severe or moderately severe case of encephalitis is readily recognized, but when we meet a patient with a history of vertigo and double vision coming on suddenly, with a temperature usually less than 100°, and with marked prostration, we should consider the case one of mild encephalitis, and should rest the patient until fully recovered, in order, if possible, to avoid the terrible sequelæ of this disease.

In acute meningitis the onset of the disease often is so abrupt that the condition with all its symptoms is fully developed in a few hours. At times it is difficult to decide whether a given case is one of encephalitis with meningeal involvement or one of tuberculous meningitis. As a rule the cell count in the spinal fluid of a tuberculous meningitis is much greater than in encephalitis, but some cases of encephalitis may present a cell count as high as a tuber-

culous case. The spinal fluid is clear in both cases. The onset in encephalitis is usually more rapid, but again cases of tuberculous meningitis may develop rapidly. The laboratory tests with the inoculation of animals, or the finding of tubercle bacilli in the spinal fluid, will definitely establish the diagnosis.

Syphilis is a common disease of the nervous system which manifests itself in two forms—the interstitial or exudative, and the parenchymatous. There is good reason to believe that one form of the disease does not change into the other form, though one patient may be afflicted with both the interstitial and parenchymatous forms. In exudative brain syphilis the predominant early symptom is headache, mild at first, but becoming more and more severe, and in the course of one to three weeks driving the patient to a physician for relief. The pain, which is described as dull, heavy, and boring, becomes so severe at night that the patient cannot sleep. This pain of itself usually is sufficient, especially with a history of an initial sore, to make one so strongly suspect the true diagnosis that the patient can be put on treatment while waiting for a Wassermann test of the blood. A delay of a few days or even of a few hours may result in a palsy of a sixth or third nerve, or even in a hemiplegia. If the exudative form is attacking the spinal cord the early symptoms as a rule are root pains at times severe, difficulty in starting the stream of urine, quick tiring of the legs in walking, and irregular areas of disturbed sensation distributed over the legs. With a positive blood Wassermann a diagnosis can be made, treatment begun, and the development of a complete cord lesion with the resultant paralysis may be prevented.

The early diagnosis of the parenchymatous form is more difficult both in brain and cord involvement. The patient usually gives a history of venereal exposure, but frequently has no knowledge of his initial infection. In the cerebral condition or paresis the only hope for the patient lies in early diagnosis and treatment. The patient complains of general nervousness, is tired and exhausted easily, usually has poor digestion, palpitation of the heart, throbbing of his arteries, and the train of symptoms so common in and usually leading to the diagnosis of neurasthenia, until he develops physical signs of paresis. The case of supposed neurasthenia should not be dismissed without a blood Wassermann, especially if there is a history of venereal exposure. A close examination may show one or both pupils slightly irregular or sluggish in their reaction to light. There may be a slight tremor of the fingers, lips, and tongue. Further inquiry may disclose disturbance of the bladder and sexual functions. If the blood of such a case is positive the spinal fluid should be examined. If the fluid is positive, the chances are that the case is one of paresis, and active, thorough and prolonged treatment should be given. The question may arise as to whether the case is one of the exudative or parenchymatous form. Usually the gross lesions of the exudative form give rise to gross and well-marked symptoms, such as persistent headache, palsy of eye muscles, and possibly a hemiplegia; but one can conceive of a case of the exudative form being so mild as to give rise to neurasthenoid symptoms only. Two points that we believe aid in the final differentiation are: first, treatment of the exudative form will produce a negative Wassermann in the spinal fluid, while, though the patient may have a prolonged remission, the fluid Wassermann in paresis usually remains positive; second, a patient with paresis rarely has a headache following a lumbar puncture, while the early exudative case suffers as much from headache as a non-specific one.

In tabes, or parenchymatous specific disease attacking the spinal cord, we would emphasize the advantage of early diagnosis. While the disease is far less deadly than paresis the patient greatly benefits by early diagnosis. Experience has shown that patients with tabes can be clinically and serologically brought back to health, to remain in this condition for at least five years with

no further treatment. We can readily see that early diagnosis gives a patient a chance for a normally functioning spinal cord. The usual early symptoms are a sluggish reaction of the pupils to light, diminution of the reflexes as shown by the knee-jerk, and pain in the legs or about the trunk, the pain being sharp, shooting, and lightning-like in character. When the pain persists about the trunk in great severity and causes the patient to vomit freely, a diagnosis of intra-abdominal and not cord disease is frequently made. If the pains are in the legs the patient is treated as a case of neuritis until the disease has advanced. The patient, unless an acute abdominal case, should not be relieved of his gall-bladder, appendix, suspected gastric or duodenal ulcer, until it is known that his pupils and reflexes are active, and, if there is still any doubt about the diagnosis, that his spinal fluid Wassermann is negative. This rule will save us from an embarrassing position at times. We may make an error in calling an early case of taboparesis a case of tabes. This is important because of the better prognosis in tabes. The onset of tabes is slow compared to that of taboparesis. The case of taboparesis in one year shows ataxia, pupilary inaction to light, and loss of reflexes equal to that sustained by a pure case of tabes of four to five years' duration. The blood Wassermann is strongly positive in taboparesis, while weakly positive or often negative in the case of tabes.

Neuralgia and neuritis are frequently confused in diagnosis. Pure neuralgia is manifested by severe darting pain along the course of a nerve trunk. Physical evidence of disease is lacking after the pain is relieved. In neuritis the pain may not only be darting along the course of the nerve involved, but the nerve trunk and the nerve endings in the skin persistently remain painful and tender on motion of the part or pressure upon it. Besides there is marked disturbance of motion and frequently trophic changes.

Puzzling cases of neuritis are those which for a time at least appear to have no sensory fibers involved. Such a case developed following a gall-bladder operation. She went to her home after recovery from the operation. Here she gradually developed a paraplegia. As some who saw her believed her original condition of vomiting was due to hysteria and not to gall-bladder disease, it was supposed at first that the paraplegia was hysterical. Later the arms became involved, marked wasting of muscles appeared, and it was thought the case must be one of anterior poliomyelitis. Three months after the onset the patient developed marked pain and tenderness along the course of her nerve trunks, and finally made a complete recovery in the course of eighteen months.

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The Possible Substitutes for Cocaine.

In the *Proceedings of the Royal Society of Medicine* for June, 1924, DALE states that confining our attention to the substances having some, even if remote, similarity to cocaine in chemical structure and a general similarity in their type of action, we have to compare them with cocaine with respect to the desirable and undesirable properties which he mentions.

In intensity and persistence of local anesthetic action, it seems to be generally agreed that cocaine stands as yet unrivaled, except, perhaps, by the recently introduced butyn. Nor can the admittedly weaker and more evanescent action of such an established substitute as novocaine be wholly compensated by using it in stronger solution. Novocaine appears to be much more rapidly destroyed in contact with the tissues, so that even when a satisfactory superficial action is obtained it does not penetrate deeply. Tropacocaine has been said by some to be as active as cocaine with local application, but its effect is more evanescent. For butyn an equal anesthetic efficiency with cocaine has been claimed by American observers, but this claim has not hitherto

received consistent support in England. Further evidence as to its efficiency is very desirable.

He has found no record of even a claim for any of the suggested substitutes, that it resembles cocaine in constricting the blood-vessels and producing shrinkage when applied to a mucous membrane. For some surgical purposes this action may be undesirable; there is no doubt that for others it is considered valuable, and even indispensable. It is important that a discussion like this should produce evidence as to whether any of the available substitutes has this action of cocaine, and, if not, whether the defect can be compensated by mixing the locally anesthetic substance with a suitable proportion of adrenalin. Similarly, it would be of interest to hear, from our ophthalmological colleagues, what importance attaches to the mydriatic action which cocaine possesses, but apparently none of the substitutes.

Many of the suggested substitutes for cocaine have the defect that their anesthetic action on peripheral sensory nerve-endings is complicated by a much more seriously harmful action on the surrounding tissue cells than that which cocaine produces. Such an effect is, of course, apt to be intensified when the action is localized by the presence of adrenalin. The data which he has seen suggest that this irritant and devitalizing action compromises the value of eucaine, tropacocaine, stovaine, and, especially, alypine. Novocaine appears to be remarkably free from it, and one would expect the higher homologue, butyn, to show a favorable record in this respect.

All the suggested substitutes appear to be more stable than cocaine to boiling in watery solution.

Most of the substitutes have less general toxicity than cocaine. Alypine is probably an exception, and being practically as toxic as cocaine on absorption, and much more irritating locally, it is not likely to have advantages for many purposes. Eucaine, tropacocaine, stovaine and novocaine are all much less liable than cocaine to produce bad symptoms if absorbed into the general circulation. The position of butyn is yet uncertain. Animal experiments seem to have indicated that it is even more toxic than cocaine itself; on the other hand it was claimed that, in human therapeutics, its use had been singularly free from bad symptoms resulting from accidental absorption.

Leaving for the moment the question of danger of the drug habit, we find that, of the available substitutes, several are much weaker in general toxicity and therefore safer than cocaine, and that some of these are sufficiently potent and penetrating in anesthetic action. But those which have sufficient potency and penetration appear to have the drawback of irritating and devitalizing the tissues, whilst novocaine, which is ideal in this respect, is deficient in power, penetration and persistence of effect. None appears to have the vasoconstrictor action of cocaine or to dilate the pupil. It is obvious that, for some of the uses of local anesthetics, one or another of these deficiencies may be immaterial, and that by choosing for each separate purpose the appropriate substance, cocaine can be, and to a large extent has been, replaced by safer substitutes. Dale believes that for infiltration-anesthesia and for nerve-blocking novocaine meets most needs. For producing analgesia by intrathecal injection stovaine and tropacocaine have been largely used, and he thinks that cocaine has been altogether abandoned for this purpose.

It is obvious that each special branch of practice must speak for itself; and Dale would suggest that the aim of the discussion should not be merely to discover whether there is any one substance which can replace cocaine for all purposes, but whether for each of the different uses of cocaine there is any less dangerous and perfectly efficient substitute; in other words, whether there is any use of cocaine for which no less dangerous substitute exists, which can efficiently produce the desired effect, even when associated with adrenalin.

Editorial

THE TREATMENT OF ANGINA PECTORIS.

Although this grave malady has been recognized as a clinical entity for a great many years, it must be confessed that our conception of its cause is still nebulous. As our readers know, Sir Lauder Brunton's introduction of the nitrites gave us a powerful group of symptomatic remedies, which, however, are practically valueless in those cases of angina in which hypertension is not a characteristic.

We have the theory of one group of clinicians that angina is due to an aortitis; of another group that it is due to disease of the coronary arteries; of a third group that it is due to distention of the aorta; and a fourth group which believes that through some reflex mechanism a true nerve pain is instituted.

By an interesting coincidence the THERAPEUTIC GAZETTE received on the same day the manuscript of the article upon "The Surgical Treatment of Angina" by Sir James Mackenzie (which appears in this issue of the GAZETTE, and which it will be perceived is not too friendly to such a method) and a copy of the *British Medical Journal* containing an article on "The Pathology and Surgical Treatment of Angina Pectoris" by Danielopolu, he being the Director of the Second Medical Clinic of the University of Bucharest.

Sir James's communication speaks for itself. Danielopolu's dissents from all the views which we have mentioned, except that which predicates a reflex nervous condition. He discusses with considerable care the nervous anatomy which he believes to be involved in cases of angina pectoris, and which has to be considered if by any means surgical interference is to be resorted to. Needless to say Danielopolu is thoroughly familiar with the very notable work of Jonnesco, but he points out that Jonnesco has had death in three out of six cases on which he operated, and, combining his statistics with those of Hofer, the death-rate has been over 60 per cent. In all cases apparently this result was due to failure of the left ventricle with acute pulmonary edema. For this reason Danielopolu believes that cervicothoracic sympathectomy has been disastrous from the therapeutic point of view, and he believes it has been made clear that the removal of the stellate ganglion in angina is incompatible with life. Danielopolu has suggested section of the cervicosympathetic chain and points out that Coffey and Brown have practiced this operation below the superior cervical ganglion combined with section of the first cardiac sympathetic nerve, and that Eppinger and Hofer have cut a nerve which takes its anatomical origin by two routes, one from the vagus, the other from the superior laryngeal nerve, with definite improvement. So, too, Stoehelin and Hotz obtained good results from cutting the first cardiac branch of the vagus. These good results in various instances would seem to be due to the fact that all these nerves must contain afferent fibers, but it would also appear that not one of these operators has succeeded in cutting all the fibers which seem to be widely distributed in their course. He believes, however, that under no circumstances whatever should nerve fibers involving the vagus be severed, but that the cervical sympathetic chain and the vertebral nerve can be cut above the inferior ganglion without any danger; or, to put it differently, he urges that in angina pectoris the cervical sympathetic cord, the vertebral nerve above the

inferior ganglion, the nerve of Hofer, or any corresponding nerves present, and the nerves which spring from the cervical sympathetic cord above the superior cervical ganglion and which pass to the heart, should be cut, by this means severing centripetal fibers and not centrifugal fibers.

It is proper to state that this communication of Danielopolu does not represent operative experience on his part, but rather a theoretical consideration of the points which he believes to be of importance.

We think that this review of his statements combined with Sir James's communication will interest our readers.

WHAT SHALL BE DONE IN DISEASE OF THE UPPER RIGHT QUADRANT?

We present to our readers, in this issue of the THERAPEUTIC GAZETTE, three papers which may be said to represent different opposed views as to the advice which should be given patients, and as to the treatment which should be instituted, when such patients present evidences of functional or organic disease in the neighborhood of the liver and gall-bladder.

In the June issue of the THERAPEUTIC GAZETTE we also published two papers: one of them by Dr. John B. Deaver, who discussed this matter from the surgical point of view, and another by Dr. Willis F. Manges, which article, it will be recalled, was copiously illustrated with excellent *x*-ray pictures dealing with the diagnosis of gall-bladder conditions.

These various contributions would seem to illustrate the fact that the profession is not a unit in this matter—at least this would appear to be the case at first sight, but we believe that our readers will reach the very wise conclusion that while there are strong advocates on both sides of the question, as a matter of practical medicine this seeming divergence of views really means that certain patients must undergo the knife and that others can be both temporarily and permanently relieved by non-surgical procedures. This state of affairs is by no means unique. It illustrates the fact that routine opinion and practice is impossible, and, again, the additional fact that the skill of the physician and surgeon is not alone involved in making a diagnosis, but that his chief skill lies in his ability to give sound advice and treatment to the individual who consults him.

THE USE OF ADRENALIN IN SUDDEN CARDIAC FAILURE.

The attention of our readers was called to this matter in an earlier issue of the THERAPEUTIC GAZETTE. Nevertheless we think that a communication which has been made to a recent issue of *La Presse Médicale* entitled "Two Cases of Reanimation of the Heart, One Temporary, the Other Permanent, by the Intracardiac Injection of Adrenalin" would be of interest. The writers, Lenorment, Richards and Sénèque, after discussing the manifestations of acute cardiac failure as met with chiefly during operative procedures, are confident that this method is of indisputable value, and quote the statistics of Pieri of seventy-five published cases with no less than twenty definite reanimations where adrenalin was employed. They also point out that as long ago as 1896 Gottlieb obtained similar success, using a rabbit, and that Mocquot, in an important paper in 1909, published in the *Revue de Chirurgie* his experience in using intracardiac injections of adrenalin combined with cardiac massage, employing dogs in his research. They also quote Crile's advice as to the intra-arterial injection of adrenalin in the dose of 1 to 2 mg.

It is unnecessary to quote other references to various papers written by French and German investigators and surgeons.

The two cases reported by these authors are as follows: A woman of forty-two, with a large carotid tumor, suffered from cardiac syncope during the administration

of chloride of ethyl. An intracardiac injection of adrenalin restored the action of the heart, but failed to restore respiration. The quantity employed was 2 cc of a 1:1000 solution, the injection being given in the third left intercostal space. Between five and six seconds later the cardiac pulsations could be noted. Death, however, occurred in a quarter of an hour.

In the second case, a woman of forty-seven, who had received an intraspinal injection of procaine and adrenalin equaling 15 centigrammes of procaine, in order that an abdominal section might be made for removal of a fibroma, while in the Trendelenburg position, suffered from acute collapse. Ether and camphorated oil were employed, artificial respiration practiced, but as these maneuvers were without result, five to six minutes after the onset of the syncope an intracardiac injection of adrenalin was made in the fourth left intercostal space. On entering the heart it was noticed that the needle was immobile, but after the injection, oscillation of the needle immediately began, and the patient made a complete recovery.

In including their paper these authors express their conviction that this method of treatment is one to be always borne in mind when desperate conditions are to be met.

SUPPRESSION OF URINE.

It can probably be said without fear of contradiction that marked or total suppression of urine, whether it be in medical or surgical practice, is always regarded with anxiety. In what may be called medical cases it develops in the course of scarlet fever and more rarely in other acute infections, and in surgical practice it is most commonly met with after operations upon the genito-urinary tract in the male, comparatively rarely after such operations in the female. As illustrative of this point, we may quote the statement made recently by Keene, that during eighteen years association with active surgical and gynecological hospital service no such complication has come under his observation.

In scarlet fever and other acute infections, the scanty secretion of urine is usually due to an acute toxic nephritis, as it is also in poisoning by bichloride of mercury, and we think it important to point out that those who are interested in this subject cannot do better than study some book dealing with the pathological anatomy of acute nephritis, because if they do so they will at once perceive that the problem in front of them does not consist in the administration of diuretics or in the giving of very large quantities of water, but that the kidneys are for a time unable to functionate because they are swollen, the capsule is tense, and Bowman's capsule, the Malpighian tufts and the uriniferous tubules are rendered inactive, first, by the destruction of their secreting epithelium, which plugs the capsule and the uriniferous tubules, and, secondly, whatever secreting epithelium may have escaped destruction is, for a time at least, unable to carry on.

In such cases, rest, warmth, cupping over the kidneys, or the application of poultices over the kidneys are advantageous in hurrying the reparative process and diminishing the renal congestion. But beyond giving those quantities of water which are necessary for the needs of the body in the sense of compensating for the loss of water in respiration and by the skin, the too free use of fluids seems to us unwise when the kidneys are so completely unable to excrete liquids. In other words, the proposition at this time is somewhat akin to the state of the lung in lobar pneumonia. No one attempts to force air into a consolidated lobe. We cannot see any more reason in attempting to force water into what is in effect a consolidated kidney.

In a recent issue of the *Atlantic Medical Monthly* there appeared a series of papers upon postoperative anuria, which papers cover the subject quite thoroughly. In Keene's opinion the suppression of renal

function only occasionally arises as a manifestation of a reflex phenomenon, for in the majority of cases he believes that a definite renal pathology is present, existing as a state antedating the operation or developing as a postoperative complication.

In regard to postoperative anuria, he wisely says that prevention is far more possible than cure, which means that before any operation is to be performed, adequate studies as to renal function are to be carried out; and it is a noteworthy fact that since such tests have been made, the mortality following prostatectomy has been very materially reduced.

There is one factor, however, which should be borne in mind in both types of urinary suppression which has not been referred to so far, namely, that where the blood-pressure is low, it should be, if possible, increased, since increasing the vigor of the circulation in the kidney hurries the reparative processes in all probabilitiy, and in addition increases the ability of the kidney to carry out its filtering function.

The condition in these cases of postoperative anuria is quite different from those instances occurring in acute infectious diseases, because it not infrequently happens in the surgical cases that a considerable amount of kidney tissue which is capable of activity still exists if these organs are well supplied with fluid and the blood-pressure is maintained.

In the same symposium Caulk states that the majority of anurias are due to mechanical obstruction or sick kidneys rather than to reflex inhibition of the normal kidney. No doubt this is quite true, but in some cases of scanty urinary secretion following operations upon the genito-urinary tract, in which the condition apparently depends upon spasm of the renal vessels, we have seen hypodermic injections of nitroglycerin or the rectal injection of cold water apparently by relaxing spasm of the renal vessels reëstablish kidney function.

It is also to be recalled that scanty urinary secretion or total anuria may exist for a goodly number of days before uremic symptoms develop and before death occurs. Thus we often see in bichloride poisoning ten days or two weeks of total suppression precede death, and Caulk says that he has seen cases of anuria last twenty-six days. Nevertheless, while it is interesting that life can be prolonged to this extent, each day of suppression adds materially to the danger, and if any measures are to be taken for relief, their early institution is essential. When calculous anuria is present—that is to say, when the ureter is blocked by stone—each day that goes by increases the destruction of the kidney structure, and in such cases the use of the *x*-ray to localize the obstruction and the employment of the ureteral catheter with the hope of dislodging it have to be resorted to as soon as the diagnosis is made. In some instances the plugging is not due to a stone, but to some mass of cheesy material or to a stricture.

Caulk's views as to what should be done in calculous anuria are radical but nevertheless reasonable. Faced with anuria, regardless of its duration, he insists upon the ureteral catheter, and if this fails he believes that surgery should be resorted to whereby the blockage may be removed. To put it differently, he asserts that patients under these conditions treated by expectant means present a mortality of nearly 80 per cent, whereas those treated by more radical measures have a mortality of about 50 per cent, and cases which have been thoroughly investigated before and immediately after this complication give results which are even better.

Last of all attention should be called to the emphasis which was placed by Randall upon the influence of bladder distention upon renal secretion, or to speak more correctly, the result of sudden relief of bladder distention, with the result that anuria and hematuria develop, not because the relief directly induces renal complications, but because the sudden diminution in intra-abdominal pressure in turn results in a low blood-pressure whereby the kidney is impaired in its function.

As indicating that our methods of treat-

ing renal disease and of testing renal efficiency have not as yet reached their full development, the statement of Sweet to the effect that there is undoubtedly an unknown toxic substance in normal urine is of interest. This means that the present methods of testing renal function do not reveal the presence of this substance or the inability of the kidney to eliminate it.

AN ILLUMINATING RESEARCH ON ALCOHOL.

For many years Stockard has carried out studies upon guinea-pigs to determine whether alcohol induced notable pathological changes. During this time the chief criticism which has been made of his researches has been based upon the fact that the alcohol was used by inhalation, which is manifestly an unusual way to get it into the body, and that the doses employed were far in excess of those which are ever taken by human beings.

In a recent issue of the *American Journal of the Medical Sciences* he contributes what may be considered in a way his final views in regard to this important subject, which are all the more important because he has made a continuous experiment over no less a period than thirteen years.

The chief object of his investigations was to determine whether severe alcohol treatments would modify the course of normal development, and whether such treatments would affect the germ cells of the species. He used guinea-pigs and states that more than one hundred individual animals have been systematically treated with alcohol for periods from a few months to as long as six years, and that he now has more than 5000 records in the various generations of the experimented animals.

Admitting that the analysis of so complex a problem is difficult, he calls attention to the fact that the sex glands and germ cells of such a mammal are placed in the body in similar positions and are protected against their surroundings in the same way as in man, and that the placenta and its attachment to the uterine wall are closely similar in women and in the guinea-pig.

Space does not permit us to go into discussion of the various controls that he employed, but it is interesting to note that the guinea-pigs were treated with fumes of commercial 95-per-cent alcohol to the point of intoxication six days a week for various lengths of time, and that some of them have been treated for as long as six years, while others have lived to the age of seven years, which is the longest life span recorded for a guinea-pig in his belief.

He asserts that even this method of administering alcohol does not injure the health or activities or in any degree shorten the life of the animal, but goes on to state that the records of the offspring and later descendants of such animals are distinctly different from the control records, believing that the alcohol affects the germ cells in some way in spite of the fact that no deleterious effect on the life of the animal is discernible.

While we must recognize that the results obtained in animals, so far removed from the human being as these are, must be taken with some caution, nevertheless there are many points of interest in this paper of very considerable importance. As a rule the average litter of alcoholized animals was smaller than in control animals, but the size of the young was not materially different. The total mortality in this progeny was about twice as great as in that of the control animals, but it is interesting to note that Stockard raises the question as to whether these effects are ultimately as important as at first glance they would seem to be, for he points out the parental intoxication has doubled the elimination of the weaker members of the progeny and that more than two-thirds of these succumbed before being born. When the experiment extended to the fourth generation the mortality is diminished very

considerably, and Stockard believes that all of the weak and altered germ cells have been eliminated from the lines so that a group of superior animals are obtained which average well above the control.

Stockard then goes on to point out that these experimental results may be claimed to have some bearing upon elimination of unfit individuals, and suggests that thereby certain races of Europe that use alcohol have been improved.

He well points out, as we have already in this editorial note, that few human beings lead so alcoholic an existence as did his animals, and expresses the view that it is highly improbable that human beings have ever injured or eliminated their normal germ cells with alcohol, although alcohol has probably eliminated some of those which were impaired.

Last of all he asserts that those nations which have used the strongest alcoholic beverages for many generations have from a standpoint of performance and modern accomplishment outstripped other nations with less alcoholism in their history, and he thinks that an explanation of this fact may be found in his experiments.

At this time when so much effort is being made to protect those who are mentally, nervously and physically unfit from the abuse of alcohol and other drugs this research is of peculiar interest. As has been well said, and as was quoted in our editorial note upon heroin in the March issue of the GAZETTE, these people are fundamental weaklings, and it is a very grave question as to whether their protection is of actual benefit to the race and whether such efforts do not increase the number of people who have abnormal characteristics. Manifestly there is a vast difference between those persons who use alcohol in moderation and those who use it to excess. Water, common salt, and many other things which are constantly taken by human beings, if used in excess are deleterious and if used in moderation are advantageous, and it would appear that alcohol is one of these substances, and also it would appear that its absolute elimination, if that is possible, will not be productive of all the good results which some persons have claimed for it.

THE TREATMENT OF MUCOUS MEMBRANES TO PREVENT OR TREAT INFECTIONS.

The tendency exists on the part of some persons to take the attitude that they know better how to treat a threatened invasion of a mucous membrane than nature does. An illustration of this occurred during the great influenza epidemic in 1918, when many employed alkaline or so-called antiseptic watery solutions, by irrigation or spray, in the upper respiratory passages, with the thought that they would wash away the invading organism, entirely ignoring the fact that nature coats the mucous membrane with mucus with the very intention of protecting it and with the further intention of enmeshing or engulfing pathogenic organisms in its glutinous mass. When a considerable quantity of mucus has been secreted for this very purpose, the patient proceeds to get rid of it by expectoration or blowing the nose. The same thing holds true to some extent at least in the case of the mucous membrane of the alimentary canal, in which canal the presence of mucus is considered in some cases as an evidence of disease.

It goes without saying that in some instances, because of an acute or chronic catarrh of the intestinal mucosa, there is an excessive secretion of mucus, which in itself is not particularly harmful, unless it interferes with digestion in the upper portion of the digestive tube, but which is of interest because it is indicative of the state of the mucous membrane.

Too frequent purgation, particularly with salines, leaves the intestinal mucous membrane naked to infection, just as the use of an alkaline douche does when employed in the nasal chambers. That such douches or sprays in the one case and saline

purgatives in the other may be advantageous under some circumstances goes without saying, but the point that we wish to emphasize is that when a physician attempts to remedy what he considers an abnormal condition, he should "Stop, Look and Listen" before he determines that the methods of protection devised by the body throughout thousands of years are not perhaps better than his comparatively novel idea.

This editorial note does not attempt to deal with the value of antiseptic substances on these mucous membranes, since they are often very useful, although possibly too much confidence is attached to them. When mucous secretion is removed with the idea of permitting the antiseptic to come in contact with the mucous membrane underneath, again the question will arise as to whether nature's method of protection is not more advantageous than the use of feeble antiseptics, and powerful antiseptics by producing irritation, which, in one sense, is a form of traumatism, will definitely diminish the future resistance of the part.

CAMPHOR POISONING.

Poisoning by camphor is a condition not frequently met with, at least in the severe form. As the drug has some reputation among women as a pain reliever, it is sometimes taken in excess for the relief of menstrual pain, and, on the principle that because a little is good more is better, an excessive quantity is ingested, which causes much flushing of the face, vertigo, occasionally some mental disturbance, and if the amount is very large, convulsions.

That the drug does not possess much toxic power when it is given hypodermically is shown by the fact that it is often used in this manner, in doses which some years ago would have been considered excessive, without the production of any symptoms at all. This is in part due to the fact that an oily suspension of a drug must of necessity result in slow absorption, although medical men often give camphorated oil hypodermically with the idea that thereby they can combat acute collapse or meet an emergency.

In a recent issue of the *British Medical Journal*, Clark has reported the case of a healthy male child of sixteen months who was given a teaspoonful of camphorated oil, equal to 12 grains of camphor, in error for cough mixture. Within a few minutes after the oil had been taken the child became convulsed and had repeated convulsions. Half an hour later the child was pale and grayish with a moist skin and a few petechial hemorrhages on the surface of the body, respirations were fast and shallow, the pulse 208 but regular, and the general expression that of terror. The stomach was washed out, a solution of magnesium sulphate being used. Some of this was left in the stomach, but the convulsions continued at short intervals. The petechial eruption became very profuse all over the body and the child died seven hours after taking the oil. The post-mortem showed congestion of the vessels of the brain but no hemorrhages. The stomach and intestines showed a few petechial hemorrhages under the peritoneal coat. There were small hemorrhages in the cortex of the kidneys, but the other parts of the body seemed to be healthy.

Clark considers that the profuse hemorrhagic eruption of the skin was perhaps the most notable symptom on record, and quotes Taylor, the toxicologist, as stating that the smallest fatal dose of camphor is one of 30 grains given to a child of eighteen months. On the other hand, Glaister speaks of a case of 20 grains causing death in an adult. Brand reports a case of a child of five years who died eighteen hours after the ingestion of 12 grains, and another instance of a child of sixteen months who died in seven hours after taking 12 grains. Clark believes that 20 grains is certainly a fatal dose unless the child is so fortunate as to get rid of a good deal of it by early vomiting.

THE TREATMENT OF SPRUE.

While comparatively few physicians among our subscribers are so fortunate or unfortunate, as the case may be, to come in contact with cases of sprue, the interests of medical men are now so general and the United States has so many interests in tropical areas that any communication which seems to possess much value in regard to the treatment of this difficult malady deserves attention; the more so when the medical man who makes a report upon a plan of treatment writes as one who has been a victim of this disease, and who on the one hand is able to vividly describe the symptoms from which he suffered, the various treatments which he received, and on the other hand the successful results which followed in his own case, and in other cases, upon the institution of the plan which he desires to report.

Thus Scott in the *British Medical Journal* states that after contracting the disease in China he suffered a rapid loss of weight, as much as three pounds a week, with a development of very severe mouth symptoms, there being on one occasion over thirty lesions in the mouth, so that even the taking of milk as a food was very painful. Associated with this was burning pain in the stomach with acidity rising in the gullet, which was followed by the development of more sore spots in the mouth. These symptoms were associated with severe carpopedal spasm resembling somewhat tetany, which destroyed rest at night and made writing almost impossible.

All sorts of treatment were tried, from taking santonin to autogenous vaccines, emetine injections, milk diet, chopped steak diet, and what he calls "that diabolical preparation," liver soup, to which sprue is preferable in his opinion. One or more sea voyages and changes of climate were also resorted to. All these measures produced no marked improvement, although there were temporary periods of remission.

Scott, who is an assistant in the London School of Tropical Medicine, noticed that in addition to the dyspeptic symptoms the stools contained a relative excess of fatty acids and a large excess of calcium. The urine also contained an excess of calcium, and the fact that carpopedal spasms were so persistent, developing as they do as a result of calcium deficiency, led him to resort to calcium lactate with the hope of obtaining relief; the more so as examination by Vines of the blood of normal persons, as compared with the blood of patients suffering from sprue, showed a marked reduction in the calcium content, chiefly the ionic calcium, although the total calcium content was not greatly affected. He found that the taking of calcium, temporarily at least, raised the ionic form in the blood to normal. He then went a step further, and remembering the relationship between carpopedal spasm and lack of parathyroid, he began taking this glandular preparation. While improvement under calcium was slight, the results that followed the administration of the parathyroid glands were, he states, wonderful; the flatulence diminished, the sore spots rapidly healed, the stools became more normal, a general sense of well-being was regained, and within a fortnight all the more acute symptoms had disappeared, and he was able to take more food. The calcium was stopped, and after six weeks no more parathyroid was administered. In the eleven months which subsequently elapsed before he made this report he has lived a normal life and worked hard, using an ordinary diet.

In this connection it is interesting to note that Scott points out that in the Far East boiled crabs' eyes and cuttlefish-shell are highly recommended by some in the treatment of sprue, and the latter certainly contains a good deal of calcium. Rest in bed of course is an essential element in the treatment of this exhausting disease.

Scott reports a number of other cases. One in particular, which had been under treatment for one and a half years, had returned to England without benefit and then had returned to the Far East, where, on arrival, he was carried ashore on a

stretcher expecting to die. Although the climatic conditions were unfortunate, under the use of calcium and parathyroid, in three weeks the patient was up and about and was carrying on his ordinary business.

Enthusiastic reports as to therapeutic results have always got to be taken into careful consideration as they are often due to undue optimism. The circumstances surrounding this report, however, are such as to lead one to believe that it possesses sufficient value to make this method of treatment thoroughly worthy of trial.

BLOOD TRANSFUSION.

Considering the amount of current literature bearing on this topic, the incorporation of its technique, of its dangers and the means of avoiding them, and of its indications, in the text-books of the day, and in view of the fact that every large hospital has its apparatus, its tested donors and its staff trained in the method of practicing transfusion, and moreover in view of its obvious and convincing benefits when properly applied, the extent to which this therapeutic agent is employed is less surprising than is the circumstance that comparatively few physicians not associated with large hospitals are prepared to apply it.

It is rational to suppose that coincident with Harvey's discovery bearing on circulation the idea should have been suggested that the giving of blood by one who had an abundance to one who had little would naturally suggest itself; and so it did, but with results as unsatisfactory, indeed as disastrous, as those which discouraged the surgeons in the Franco-Prussian war. Incident to modern studies of the physiology of the blood, of incompatibilities, of lysis, of the cause of clotting and the means of preventing this, the whole subject has been placed on so safe a footing that by means of simple tests it may be determined whether the blood of one individual will or will not cause agglutination or hemolysis of that of another. Safe donors may be found for each individual. Clotting can be prevented, and the given blood may remain a living and helpful agency toward better health on the part of the receiver. Since it has been found that the blood which does not cause agglutination does not cause hemolysis, the agglutination test is utilized in selecting the donor. When because of emergency and in the absence of tested donors transfusion is urgently and immediately called for the chances of serious accident following the selection of an untested donor are about 5 to 100. Even this chance could be materially lessened by a rapid test of the suspended corpuscles of the donor with the serum of the recipient, a test requiring but a few minutes. It would be naturally important to rule out syphilis and malaria in the one giving the blood.

Ottenburg *(Long Island Medical Journal,* June, 1924), writing on this subject, expresses strong preference to whole blood, holding that the citrate method, though easily and quickly applicable under nearly all circumstances, is followed by more marked reactions than those incident to the use of the whole blood. In the treatment of hemorrhage he particularly advocates the citrated blood because, strange though it may seem, such blood acts as a coagulant. The warning is given to stop transfusion in case the patient becomes short of breath, starts to cough, or exhibits cyanosis.

The results of transfusion in septic conditions have not been convincingly favorable. In various anemias repeated transfusions have been helpful. In shock and hemorrhage they are at times life-saving.

Bearing on transfusion of the newly born for hemorrhagic disease, the results have been satisfactory; many reports showing this have been published.

At times the longitudinal sinus has been employed as the route of injection, this being perhaps the largest and most accessible of all the comparatively superficial veins. Mayes believes that the median basilic vein at the elbow can always be

reached by a careful dissection and that this is a safer route than is the sinus. He reports excellent results in neonatal children, 7 out of 11 having survived. Two of the cases resulting fatally were moribund, and one was not a bleeder. Excepting these from his list, he has more than 90 per cent of recoveries. Indeed he is so impressed by the beneficial effects accruing from transfusion in the newly born that he advises transfusion in all prematurely or instrumentally delivered babies, apparently right at birth, but not doing well after the second or third day, providing hemorrhage cannot be excluded. He, moreover, holds that many toxic or anemic infants, not bleeders, may be saved by transfusion.

BETTER SURGERY.

Less than twenty-five years ago, whether in private homes or in hospitals, the man or woman on whom a surgical operation was performed was, after a preliminary purging, given ether copiously and unskilfully, by a usually inexperienced assistant or colleague or a junior resident. This was followed by vomiting, at times long continued. The operation itself by thirst, overmastering thirst, which was unrelieved. If the operation was an abdominal one, by pain, constant, wearing, even agonizing, for the control of which no anodyne was given. Anesthesia deaths, postoperative pneumonia, phlebitis, stitch abscesses, were common. Even for comparatively trivial surgical procedures long confinement to bed was insisted upon. Under which circumstances it is not to be wondered at that the patient dreaded the surgeon and postponed going to him till the need became imperative and overwhelming; that the internist was loath to subject those in his charge to what was in itself a shocking and life-threatening ordeal; that the average hospital had trouble in filling its beds except with those who had no other choice.

At the present day the difficulty lies, not in bringing patients to the surgeon, but in keeping them from him; not in getting patients into hospitals, but in keeping them out. Practically all well-conducted institutions are crowded to capacity. Patients welcome surgery as a quick, safe, usually comfortable way of regaining health. Internists are, at times, too ready to shift the burden of accomplishing a cure into the hands of their surgical colleagues.

There are many factors which have wrought this change; perhaps they can be summed up by the words "better surgery." Better surgery includes many things: earlier and more assured diagnosis, gentler and more rational preparation, prevision and guarding against operative complications, better and more skilful anesthesia, less trauma to tissues, simpler and more rational and efficient operative technique, better nursing, under which may be included the proper use of anodynes, the relief of thirst, the guarding against acute gastric dilatation, the provision for free elimination, and not least in its importance, the maintenance of the morale of the patient. Moreover, in so far as hospitals are concerned, food, service and equipment have been greatly improved.

Bearing on the preparation of the patient, and a consideration of the operative and postoperative risks and how they may be avoided, a violent catharsis is not given; the eliminating capacity of the kidneys is estimated, and if deficient, is brought to its highest potential; measures are taken, where needful, to insure blood-clotting in normal time; and due consideration is given to a history of pulmonary tuberculosis or its actual presence, since in one suffering from such a condition ether is contraindicated, as it has many times converted a latent infection of this nature into an actively progressing and fatal one. Cardiac conditions, with competent kidneys, in themselves should not constitute a bar to needful surgery.

There is a timeliness in surgical intervention consideration of which has lessened operative and postoperative mortality.

Thus during the acute phases of hyperthyroidism, or of pelvic peritonitis, or of jaundice, except to relieve obstruction, the preparation lies in palliative measures, till such time as there has been a systemic reaction against the toxic agents. Nor, except in emergency, should any major operation be performed on one suffering from bronchial irritation or harassing cough.

The choice of anesthetic is now a comparatively wide one. Of those used locally novocaine remains the safest and most popular. Nor is there any region of the body in which sensation may not be completely and safely obtunded by one skilled in nerve anatomy and experienced in the employment of injection. Though it is the safest form of anesthesia it still has a limited vogue because it does require special knowledge and, for general surgery, special apparatus and large experience.

Ether is perhaps the safest general anesthetic in unskilled hands, and is probably more generally used than is any other. Nitrous oxide-oxygen, often supplemented by local infiltration with novocaine, by ether, or by both, is growing in favor, but is not safe in the hands of those untrained in its use.

Far more important, in so far as the interests of the patient are concerned, than the choice of anesthetics is the skill and experience of the anesthetizer. In the hands of one thoroughly trained in this branch of surgery nitrous oxide-oxygen would seem to be the quickest and safest agent and the one least likely to be followed by unpleasant or by life-threatening sequelæ.

As for the technique of operation, the surgeon has learned the importance of speed compatible with thoroughness; of the gentle handling of tissues; of the saving of blood; of the guarding against shock; of the removal of necrotic tissue; of the obliteration of dead spaces; of the preservation of local circulation by the avoidance of tension; of the value of transfusion and the need of adequate preparation for the prompt carrying out of this procedure when indicated. He has further learned the postoperative need of the tissues for water, and the means of supplying them with this, when the stomach is not available, by enteroclysis, hypodermoclysis, or intravenous injection of Lock's solution or normal saline. He recognizes the fact that persistent vomiting with running pulse usually indicates acute gastric dilatation, with a high mortality unless relieved, as it is promptly and completely by the stomach tube. He has learned the devitalizing effect of pain and relieves it by morphine in adequate doses, before it has exhausted the patient. His drains, if used at all, are of such nature as to act efficiently in preventing or relieving tension incident to exudate, and consequent tissue necrosis from lack of blood supply, and as to allow of easy and painless removal when they have served their purpose. Confinement to bed is numbered by days rather than by weeks. The atmosphere of the sick-room is one of cheerful optimism.

Whence it follows that surgery now offers and gives to tens of thousands prompt cure of many crippling ailments, with little or no pain or risk to life, and under such conditions that many look back upon their operation as one of the most pleasing experiences of their lives.

Progress in Therapeutics

Medical Therapeutics

A Systematic Use of Opium Following Certain Laparotomies.

In *California and Western Medicine* for June, 1924, COLLINS states that being impressed with the great number of cases covering many years of practice during which opium had been used, he decided to try the method of treatment of Henry Smith of Amritsar, India. Collins's practice in the past was to give heroin or morphine when necessary to control pain; this meant when everything else had been tried first, and then only as a last resort, feeling that we were beaten when we did prescribe it; that pain so severe as to demand the use of morphine should mark the uneventful recovery of the patient. This hypothesis was all wrong.

Before operation, the standing order in all hospitals is to give morphine; upon this we are agreed. During operation the patient is completely under the anesthetic, and we can assure him that he will not suffer. But what can we offer him for the next three or four days? Will surgery be robbed of its terrors while patients continue to suffer the distressing symptoms following operation? Can this be overcome? Is there any objection to the use of opium? How shall it be used?

In practically every laparotomy peristalsis is suspended for several hours, and sometimes many days, dependent upon the magnitude of the operation, time consumed, manipulation of the viscera, particularly in operations for fecal fistula, ruptured appendix, pelvic peritonitis, ruptured viscus, operations for traumatic injury of the intestine, anastomosis, etc.

We must expect a considerable amount of pain before the resumption of peristalsis. When peristalsis begins it starts locally and is signaled by pain. This colicky pain is the contraction of the circular muscular fibers of the intestine at one or more points, and produces at the particular point a temporary partial obstruction of the canal. There is no uniform peristaltic wave downward, but the wave is obstructed and we have reverse peristalsis, which means vomiting. This must be prevented, and can be prevented by the use of opiates. One dose will relieve the spasm, but another dose must be given in four hours to prevent its return.

Following the severer types of laparotomies, he begins four hours after operation with a hypodermic of pantopon, tincture of opium, or morphine, and repeats the dose every four hours as a standing order. This is kept up from twenty-four hours to four days. A peculiar thing about the regular use of opium is that invariably the patient begs to have it discontinued, usually objecting to the prick of the needle, and once discontinued never asks for it again; in fact, he does not advise allowing the patients to know what they are taking. The mention of opium brings to mind the dread of habit-formation. If there is any possibility of acquiring the habit, it will be by giving the patient a demonstration of the properties of the drug. This can best be illustrated by giving a general anesthetic to a woman in labor. At first she objects to the administration of ether, even after suffering great pain; but one demonstration of the happy relief of suffering and you have a woman whose whole mind for the time is concentrated upon the ether cone. Her cry is "give me some more." So with morphine.

Peristalsis will come when it will come, and purgatives given too early will not start it, but only cause more vomiting, pain, and suffering.

His personal experience of fifty cases of the severer types of laparotomies, consist-

ing of operation for fecal fistulæ, ruptured appendix, pelvic abscess, anastomosis of intestine, resection of cecum, large ventral hernia, pyloric resection, hysterectomy, etc., may be summed up briefly: In 30 per cent of the cases the bowels moved with expulsion of gas, without a physic, on or before the third day; 22 per cent had some nausea after the first day. All patients had little difficulty lying on the side.

None of the cases had pain or hiccough. Not one case asked for an injection after the injections were ordered stopped. Fifty-four per cent requested that the injections be discontinued, objecting to the injection. Nearly all the cases did not know what they were getting, and, feeling fairly comfortable, did not see why they should be disturbed by being pricked with a needle. Unfortunately, he did not keep a record of the percentage of cases that had to be catheterized, but feels sure that they were less than when an opiate is not given regularly. All the patients enjoyed more sleep.

The Treatment of Lye and Acid Burns of the Esophagus.

In the *Journal-Lancet* for May, 1924, HABERLIN states that the treatment consists in the immediate and permanent tubage of the esophagus after the accident. The advantages are that the sound permits a thorough stomach lavage, preventing a long stay of the corrosive substance. If these substances are also toxic, for example, phenol, we prevent a prolonged absorption and thus an intoxication; if the substances are purely caustic, the chances are better that the burns will be only superficial, and perforation of the stomach and perhaps cicatricial stenosis of the pylorus may be avoided. A second advantage of the permanent tube lies in the possibility of nourishing the patient from the start, thus sustaining his strength for some possible serious operation later on. An important point is that this treatment does not need a special instrument or a specialist; but the main point consists in the fact that in all cases treated by the permanent stomach tube he has never observed a subsequent cicatricial stenosis of the esophagus.

Since 1913 Professor Roux has employed this treatment in the surgical clinic of Lausanne. The aim of Haberlin's paper is to convince the profession of the simplicity, the little danger, and the excellent results obtained with this method. The appreciation of this treatment consists essentially in the comparison with other methods of treating the sequela of these burns, namely, cicatricial stenosis.

Haberlin first describes the technique used, then he discusses the results of several existing methods, their danger, their efficiency, and their durability, and he closes his study with a hypothesis on the action of permanent tubage, confirmed by some experimental work on dogs.

A case of fresh lye burn of the esophagus entered the hospital. Professor Roux introduced a stomach tube and left it in place. He presented the patient four weeks later and expressed his idea as follows: "After swallowing the caustic, the esophagus is so sore that the patient dreads to take food. The rest, the spasm, the reactional infiltration, the shape of the canal, the circular disposition of the cicatricial tissue in the submucosa—all this works together to make the esophageal stricture a worse imitation of the urethral stricture."

Since then Roux has used this method six times, and always with the same success—sufficient nutrition and no cicatricial stenosis of the esophagus.

Haberlin proceeds in the following manner: He chooses an esophageal sound made of soft rubber (Nélaton), the diameter being from 8 to 11 mm.; for infants one may use two rubber catheters sewed together in order to obtain the necessary length. Then he greases the sound thoroughly and introduces it through the nose; the tube easily glides into the esophagus and down into the stomach, if the esophagus is not contracted by violent spasm. In the latter case it is safer to put the patient to sleep. Then the stomach is washed out thoroughly, and the

tube is fixed to the cheek with adhesive plaster and left in place for about three weeks. Evidently this is a rather disagreeable condition, but in a few days the patient tolerates the sound without pain or discomfort.

The Immunity and Pathology of Syphilis in Relation to Prognosis and Treatment.

In the *Weekly Roster and Medical Digest* of Philadelphia of May 31, 1924, KOLMER points out that the subjects of immunity and pathology of syphilis in relation to the treatment and prognosis of the disease were too large to be discussed in a brief space, but that emphasis may be placed upon a few selected topics:

Immunological processes are apparently brought into play soon after infection, but these are apparently confined to the tissues involved. The chancre is probably not only the result of inflammatory changes engendered by *Spirocheta pallida* but a defense reaction, and any measure tending to suppress this reaction, as insufficient medication, may actually aid in the dissemination of spirochetes as shown by the results of experimental studies with rabbits, and indicating the advisability of vigorous rather than half-way therapeutic measures at this time to effect rapid and complete sterilization.

If complete sterilization is not accomplished at this time, dissemination of the spirochetes results by means of the lymph and blood; organs are progressively invaded, but infection is constantly resisted by similar tissue immunological processes which may effectually prevent infection of an organ or organs.

Latency in syphilis after the secondary stage is probably due to immunological processes. But this immunity may be broken down by trauma in a broad sense, intercurrent infection, and even by the administration of antiluetic drugs as in the so-called provocative Wassermann reaction. When this occurs, vigorous antiluetic treatment is indicated unless otherwise contraindicated.

The nature of the immunological changes in syphilis is not fully understood. They are not to be ascribed altogether to antibodies in the blood. Factors are present in the tissue cells which cannot be measured by test-tube serological methods. Pregnancy aids in this immunological defense, and particularly in the protection of the central nervous system; the mechanism is unknown.

It is not now sure that the uncured syphilitic is resistant to superinfection. Uncured syphilitic rabbits may be reinfected and superinfected. It may be that superinfection may occur without the production of a chancre because of the absence of a defense reaction at the point of entry of spirochetes.

The pathology of early syphilis offers no difficulties in treatment. The pathology of late or chronic syphilis may offer considerable difficulty for various reasons: (*a*) Because of fibrosis of the capillaries; (*b*) because chronic fibrotic and degenerative syphilitic and other lesions may lower tolerance for antiluetic drugs. In chronic syphilis fresh or early lesions are likely to be constantly developing; these are amenable to treatment so that the progress of the disease may be arrested by therapeutic measures even though the damage already done may not be eradicated.

The antibody-like substance in serum and spinal fluid responsible for the Wassermann reaction is not a true antibody in the sense of being destructive for *Spirocheta pallida*. It is a secondary product of cells in syphilitic exudates capable in the test tube of flocculating tissue lipoids in colloidal suspension; these aggregates may be seen by the naked eye under technical conditions as in the Kahn and Sachs-Georgi reactions. In the Wassermann test they are not seen by the naked eye, but absorb or fix complement which is detected in the second stage of the test.

The Wassermann reaction is not a biologically specific reaction because the best extracts employed as "antigens" are not products of *Spirocheta pallida*. The reaction is due to the peculiar property of the

"reagin" to flocculate the lipoids of the extract called "antigen."

The Wassermann reaction in this country, however, can be made specific for syphilis because a similar kind of "reagin" is apparently produced only in other spirochetic diseases, as frambesia, which does not occur in the United States.

The Wassermann reaction should be made as sensitive as is consistent with specificity. Even under the best of conditions falsely negative reactions will occur when the spirochetes are so few or so latent that appreciable amounts of "reagin" are not being produced.

The Wassermann reaction is an index of infection, although there is not always a parallelism between the degree of complement fixation and symptoms if spirochetes are active in physiologically unimportant tissues.

The Wassermann reaction should be by a true quantitative method for best results. Under proper technical conditions it is an invaluable and indispensable aid in the diagnosis of latent and chronic syphilis which may defy clinical diagnosis by even the most expert. It is likewise a valuable guide in treatment when properly and intelligently employed.

The Treatment of Psoriasis with Intravenous Injections of Sodium Salicylate.

MALONEY, in the *Archives of Dermatology and Syphilology* for June, 1924, states that in view of the encouraging results obtained in his cases, this method of treatment seemed worthy of a trial. Twenty patients with psoriasis attending the dermatological clinic at the New York University and Bellevue Hospital Medical School were used in his test. These patients presented most of the different types of psoriasis and had had the disease for periods varying from one to fifteen years, with an average duration of six years. There were nine males and eleven females, the ages ranging from 15 to 47 years, the average being 20 years. None had what might be called recent cases, but practically all gave the usual history of attacks followed by periods of freedom, either spontaneously or as the result of treatment. Many of these had been under treatment at this clinic from time to time for long periods and had received about all the accepted methods of treatment, with the usual results or lack of results.

The patients were all given the same preparation of sodium salicylate—a 20-percent sterile solution put up in sealed ampoules. Intravenous injections were given twice a week, starting with an initial dose of 0.5 gm., increasing 0.5 gm. at each subsequent injection until the dose of 3 gm. was reached. This maximum dose was continued during the remainder of the treatment.

The injections were usually well borne and no discomfort other than a generalized sensation of heat was felt, with the exception that three different persons complained at times of a sensation of burning along the course of the vein. One, a man aged twenty-two, experienced this sensation at every injection after the fourth, the burning at times being so intense that it caused him to squirm and cry out, and it was only with great difficulty that he was able to remain on the table and submit to the completion of the injection. In no case did thrombosis result.

The number of injections varied in each case from five to twenty with an average of nine, and the amount of sodium salicylate injected was from 8 gm. to 43.5 gm. with an average of 15 gm.

It was noted that there was an improvement in all patients receiving from seven to nine injections, as there was a decided tendency for the scales to disappear; in a few cases this was so noticeable that the patients reported that "the spots dropped off." This disappearance of scales was most often seen in lesions covering a considerable area, with little infiltration, and particularly in lesions on exposed surfaces. These patients, however, were being treated

during the late spring and summer, at a time when there is apt to be an improvement in most cases, and exposure to the sun may have played and probably did play a considerable part in the result obtained.

Lesions on the covered surfaces, guttate and small nummular lesions with more or less infiltration did not react so well. There was no lasting improvement in any case, as all lesions recurred within a short time after cessation of treatment. No patient was cured.

During the administration of the sodium salicylate intravenously, no other treatment, either general or local, was given, except in a few instances when patients practically demanded some salve, and then plain petrolatum was used as a placebo.

It is probable that whatever effect was obtained was due to the keratolytic action of the salicylic radical in the solution, and this effect could probably be just as readily obtained from the external application of salicylic acid itself.

While the number of cases in which this method of treatment was used was not very large and, as is usual with clinic patients, it was impossible to get all of them to attend regularly and to continue treatment as long as desired, yet he thinks that enough injections were given to several patients to demonstrate the efficacy or lack of efficacy of this method of treatment. Taking his results all in all Maloney states, from his experience in the use of sodium salicylate intravenously, that he decided that the meager beneficial results obtained did not warrant the continuance of its use, and it was therefore discontinued.

Cardiovascular Syphilis.

In the *Annals of Clinical Medicine* for May, 1924, RIDGE states that in the treatment of these lesions he is still of the opinion that specific medication is of little value. Of one thing he is convinced, and that is the fact that arsenicals are contraindicated in the majority of cases. He has seen several deaths seemingly due to the administration of small doses of neosalvarsan. He cannot recall from his own experience a single case in which he can honestly say that the administration of such preparations has been of any more value than has the tannate of mercury, two grains per day by mouth, and moderate doses of potassium iodide. Whether or not the reaction following arsenic is a true Herxheimer or not he is not positive. However, there is a marked reaction either the result of stimulating foci of infection in a specific manner or due to the effect of chemical agents upon already devitalized tissues.

[Donovan's solution is often very useful in these cases.—ED.]

Cod-liver Oil as an Addition to the Dietary of the Under-nourished Diabetic.

GUTHRIE in the *New Orleans Medical and Surgical Journal* for June, 1924, asserts that if carbohydrates are to be restricted in the diet of the diabetic, fats must be substituted as a source of energy. If fats cannot be substituted in proper quantity either the individual must live on a lower plane of activity or be helped by insulin to reach the grade of activity commensurate with his usefulness. Fat restriction implies the risk of deficiency of one and probably two essential substances. These substances are found in cod-liver oil. Cod-liver oil would then seem to be a most desirable addition to the dietary of a diabetic who has lost much weight. This addition can be made by substituting cod-liver oil for other fats as soon as the fats in the diet have reached, say, 60 grammes daily. Thirty cubic centimeters of the oil are of very much more value than the equivalent of other known forms of fat from a nutritional standpoint.

He has used cod-liver oil as a routine in the treatment of emaciated diabetic patients during the last six months, and has found that the gain in weight and strength has been more rapid with it than without it. Eight cases were kept on a maintenance

diet, some with and some without insulin, and weighed regularly. This method of observation is imperfect because of possible change in other conditions, but the course of the eight cases in which it was carried out seemed to justify the procedure.

In a dietetic regimen it seems highly desirable to attempt to embody all of the essential substances known as vitamins. The exact amount necessary cannot be laid down in the present state of our knowledge. Failing this exactness of dosage, one must safeguard the patient by adding to the diet what would be slight excess of these substances. No harm could possibly come to the patient under such a plan comparable to the harm that might result during a prolonged dietetic restriction where these substances were lacking. Cod-liver oil seems to be the richest possible known source of fat-soluble substances and is utilized by him to make sure they are taken by the patient.

In the series of eight cases, whose ages ranged from 26 to 62, observed by the writer upon the cod-liver oil addition to the diet, the usual observations were made upon the urine and the sugar content of the blood. The diet was checked with the usual degree of accuracy in a diabetic clinic for ambulatory patients. While there appeared a more rapid gain in weight and strength with cod-liver oil than without it, no improvement in the tolerance that could be attributed to this measure was observed.

Goitre.

In the *British Medical Journal* of June 7, 1924, McCarrison states with regard to treatment that if intestinal infection has the importance which he attributes to it, then two things should be possible: (1) goitre should be curable by the administration of gastrointestinal antiseptics; and (2) goitre should be preventable by preventing such intestinal infection. It is now eighteen years since he first drew attention to the effect of such intestinal antiseptics as thymol, salol, betanaphthol, and soured milk in causing the disappearance of a proportion of cases of recent goitre when administered internally. This observation has since been abundantly confirmed, and the curative value of intestinal antiseptics in this disease is now beyond dispute. At one time he thought that intestinal organisms exerted their effect in causing goitre by means of their toxins, an opinion based on the knowledge he then possessed. It was difficult at that time to conceive of any other way in which they could act; but further work has increased the range of possibilities. Although it is possible that intestinal bacteria may act in this way, yet, having regard to the effect of lack of iodine in causing thyroid hyperplasia and goitre in animals, and to the influence of iodine in preventing goitre in both animals and man, it seems more probable that intestinal bacteria exert their influence in a different way.

Quite recently Walton has recorded an interesting observation which serves to throw further light on a probable mode of action of intestinal bacteria in causing goitre and of intestinal antiseptics in curing it. Twenty cases were treated with regular doses of syrup of iodide of iron and twenty with intestinal antiseptics alone. About 50 per cent of each group were cured. If the two treatments are combined a further 40 per cent were greatly benefited. It follows, therefore, that the disinfection of the bowel made the iodine ingested more readily available for the needs of the thyroid gland and of the organism. It may be that it facilitated the assimilation and utilization of iodine, or it may be that the presence of certain intestinal bacteria increased the needs of the organism for thyroxin as do certain other infections, or that their products interfered with the utilization of iodine or the manufacture of thyroxin by the gland, or that they robbed in some way the organism of the small amount of iodine contained in the food that would otherwise have been available to the thyroid for the elaboration of thyroxin. The last is the interpretation placed on the facts by Plummer; it is supported by the observation that thyroxin and desiccated thyroid are not readily absorbed,

at least as such, from the intestinal tract of many persons having diffuse colloid goitre.

In 1912 McCarrison recorded the fact that massive doses of vaccines—B. coli, staphylococcus, etc.—had a great effect in causing the disappearance of recent goitres. Their action is non-specific; how it is to be explained he does not know, but he feels sure that when we are in a position to explain it we shall know more about the thyroid gland and more about goitre.

Kerosene as a Delousing Agent.

JOFFICK, in the *China Medical Journal* for April, 1924, states that kerosene very often immobilizes, but does not always kill lice.

When used as an insecticide for clothes it is effective only in a closed space where its evaporation is prevented.

Methods recommending a spray or even a complete anointing of the body are not safe, and in no case should they be applied as the single method of disinfestation.

The Effect of Fluid on the Temperature and Blood Concentration in the New-born with Fever.

BAKWIN, MORRIS and SOUTHWORTH in the *American Journal of Diseases of Children* for June, 1924, state that their results emphasize two points of interest: First, the striking parallelism between the effect of fluid on the blood concentration and on the temperature in the new-born with fever offers strong evidence in favor of the view that this particular type of fever is due to dehydration. A second point of interest is the greater efficacy of the oral over the subcutaneous or intraperitoneal routes in reducing the concentration of the blood and lowering the temperature in the new-born with dehydration. When the fluid is given by mouth it enters the blood promptly, as is indicated by a fall in the serum protein concentration and in the red cell count. When the fluid is given hypodermically or intraperitoneally the fall in blood concentration is neither so marked nor so prompt as after gavage. Apparently a process exists whereby fluid given by mouth is promptly absorbed into the blood and tissues. Fluid given into the subcutaneous tissues or the peritoneal cavity enters the blood much more slowly and to a much less extent.

Similar results were obtained by one of the authors in older infants dehydrated as a result of severe diarrhea. During the summer of 1921 a series of these infants was treated with fluid by mouth. Water or 5-per-cent glucose solution was dripped into the stomach at a slow rate by means of a tube inserted into the stomach through the nose. A fine catheter (No. 8 French), well lubricated, was used and the fluid administration continued for several hours. A drop in blood concentration, an improvement in the skin turgor and an increase in the urine flow followed when fluid was given in this manner. When the fluid was given hypodermically or intraperitoneally the increase in plasma water was slight or entirely absent and there was usually no effect on the urinary flow. An improvement in the skin turgor in the neighborhood of the fluid injection was frequently observed.

It is of interest to note in this connection that Robertson and Bock found that, in adults with post-hemorrhagic anemia, fluid by mouth was second only to blood transfusion in the rapidity with which it increased the blood volume.

Their conclusions are that when fluid is given by the mouth in the proportion of from 30 to 40 cc per kilogramme of body weight a prompt fall in the temperature and blood concentration follows with great regularity. The temperature usually reaches normal within from 30 to 90 minutes.

When the fluid is given hypodermically or intraperitoneally, the effect on the temperature and blood concentration is neither so marked nor so regular as after water by mouth.

Water by mouth, in amounts similar to those used in the new-born with fever, has practically no effect on the temperature of infants with fever due to various infections.

In a group of older infants, dehydrated

as a result of severe diarrhea, fluid by mouth is much more effective in reducing the concentration of the blood than fluid given by hypodermoclysis or intraperitoneal injection.

Carbon Dioxide Treatment in Acute Alcoholic Intoxication.

In the *Boston Medical and Surgical Journal* of June 5, 1924, HUNTER and MUDD state that carbon dioxide administration, to increase the pulmonary ventilation, has been tried on four cases of acute alcoholic intoxication with a rapid revival from coma. Lesser degrees of intoxication did not show such striking improvement.

An experiment was performed which apparently showed that the alcohol in the blood may be lowered more rapidly by the increased lung ventilation from carbon dioxide administration than would be the case without it.

Inasmuch as the majority of deaths from alcoholism at the present time result from the ingestion of lethal doses of alcohol and not from particular poisons in the beverage, it is suggested that carbon dioxide administration would be of value in the treatment of all cases of alcoholic coma. In cases of methyl alcohol poisoning carbon dioxide would be even more efficacious, as, due to its lower boiling point, it has a higher partial pressure than ethyl alcohol, both being at the same concentration.

Bismuth in the Treatment of Syphilis.

PARNELL in the *Proceedings of the Royal Society of Medicine* for April, 1924, states that treatment was commenced in March, 1923, sodium and potassium tartro-bismuthate being used at first. Owing to the unsatisfactory results obtained with these preparations, metallic bismuth cream has been used since April, 1923. This preparation contains 0.15 grm. metallic bismuth in each cubic centimeter; the composition of the cream being otherwise the same as Lambkin's mercurial cream, viz., a creo-camph. and paraffin base of suitable melting point (37° C.).

The disadvantages of the insoluble tartro-bismuthate salts are: (1) The injections were painful. (2) There was a considerable variation in the amount of the preparation absorbed. On one occasion the first dose (1 cc), injected fourteen days previously into the right buttock, oozed out of the needle which had been plunged into the same buttock before injecting the third dose. No absorption had taken place in fourteen days. (3) The spirocheticidal effect was very feeble. *S. pallida* persisted or returned after a temporary disappearance. (4) Not once did a commencing seronegative Wassermann case remain negative. All such cases became positive during treatment. (5) The effect on manifest lesions was certainly greater than that of mercury, but inferior to that of metallic cream, and greatly inferior to that of arsenical preparations.

Fifty-seven men have been treated with metallic bismuth; 567 injections were given.

The injections are given in the buttock in precisely the same manner as mercurial injections—once a week (1 cc), a total of 1.2 grm. metallic bismuth being administered in eight weekly injections. Strict asepsis must be maintained.

He concludes that metallic bismuth cream cannot be considered comparable to the neosalvarsan-type drugs. It would appear to occupy a half-way position between mercury and neosalvarsan, and although inferior in every respect to Ehrlich's preparations, it is decidedly of greater clinical power than mercury.

Compared with mercury, it is: (1) Far less toxic and pleasanter to take. (2) Of greater clinical therapeutic value. (3) Of slightly greater spironematicidal power. (4) Equally ineffective in influencing a positive Wassermann, and in preventing early seronegative cases from becoming positive.

Bismuth appears to offer a better outlook than mercury in cases which are intolerant of arsenic. It could be given in cases unsuitable for the arsenical preparations, and liable to tolerate them badly, namely, cases of gross visceral syphilis, aortitis, arsenical

jaundice, etc. In certain cases of this type it should prove of value as prodromal treatment, to precede cautious dosage with arsenical drugs.

Lastly, those who favor adjuvant treatment (namely, mercury plus neosalvarsan) should find a clinically more powerful and less toxic ally in metallic bismuth.

[It would seem unwise to use bismuth suspended in paraffin as it is a deterrent to absorption.—Ed.].

The Causes of Failure in the Treatment of Pulmonary Tuberculosis by Artificial Pneumothorax.

Matson, Matson and Bisaillon, in *Tubercle* for April, 1924, state, based on observations made on 600 cases during a period of twelve years, that adhesions are the most frequent cause of failure of artificial pneumothorax, 40 per cent of failures being due to them. They are present in almost direct proportion to the duration and intensity of the disease, causing over 24 per cent of the failures in earlier cases which were improved, but eventually fatal, and 54 per cent of the failures in the more advanced cases which were progressively fatal.

They believe, therefore, that artificial pneumothorax should be utilized earlier in the course of pulmonary tuberculosis than has heretofore been the custom. While they do not advocate artificial pneumothorax in early infiltration cases, they do believe it is a mistake to wait until compelled to use it because of failure of the usual therapy.

If excavation of lung tissue has taken place, and the outcome of the usual therapeutic procedures is in doubt, then artificial pneumothorax should be considered. In cavity cases, provided there are no contraindications, the sooner an artificial pneumothorax is instituted the better.

Artificial pneumothorax exerts a beneficial influence upon the active disease in the non-compressed lung, if it is not too extensive. While 58 per cent of their cases had active or quiescent disease in the non-compressed lung, only 12 per cent were unfavorably influenced.

Progression of disease in the non-compressed lung was responsible for approximately 8 per cent of their failures.

Serous exudates occurred in practically every case at some time during pneumothorax treatment, and in 30 per cent it was present in quantities of 50 cc or more; but as long as it remained serous it was never a cause of failure, and, even when becoming purulent, was seldom a cause of failure.

These writers state that tuberculous enteritis, when so severe as to interfere with the patient's nutrition and unresponsive to treatment, is a contraindication for artificial pneumothorax.

Tuberculous laryngitis, unless so severe that the patient cannot be nourished, is not a contraindication.

Lung perforation and obliterative pneumothorax were infrequent causes of failure.

Intracardiac Injection of Pituitrin in Asphyxia Neonatorum.

Rainey, in the *British Medical Journal* of April 26, 1924, records the following case because it is the first time he has used pituitary extract in this manner, and says he does not happen to have read of its being so used in such cases:

He delivered a primigravida, with a pelvis just under normal measurements, of a male child weighing seven pounds. The head presented in the R. O. A. position. The first stage took from fifteen to eighteen hours to complete; the membranes had ruptured at the onset of labor. At the commencement of the second stage the head was well down in the pelvic cavity; progress was slow, and as after five hours with fair pains the caput had not quite reached the perineum and the fetal heart sounds had begun to weaken, he applied axis-traction forceps. No force was needed to bring the head into the outlet, where the forceps were removed. The child was born some ten minutes later in a condition of white asphyxia, with the cord only feebly pulsating. The child made no attempt at respira-

tion, and by the time he had been separated and his throat cleared of mucus the pulse ceased. In spite of pulling on the tongue, hot bath, cardiac massage, and artificial respiration by inflation, the heart was not audible. He had no adrenalin with him, but having some pituitrin, he injected 0.25 cc directly into the heart, and continued inflation respiration. Within half a minute the heart began to beat, and so continued with increasing force. After five minutes' further forced respiration the child began to make three or four active attempts at respiration a minute. By the end of an hour he was breathing satisfactorily, and his condition gave no further trouble.

In the *Journal* of March 29 there is a note on pituitrin being injected intramuscularly in a case of asphyxia pallida neonatorum; but it would appear obvious that if the circulation has actually failed nothing short of intracardiac administration can be of any avail.

Headaches.

In *Minnesota Medicine* for May, 1924, BERRISFORD states that an affection not infrequently mistaken for headache of ocular origin is the so-called vacuum headache, a condition established as a clinical entity by Sluder and Ewing. This malady is described by Sluder as "a low-grade unending headache" brought about through the closure of the frontal sinus without nasal symptoms or signs (*e.g.*, obstruction or secretion) and made worse by use of the eyes. The pain experienced is due to a partial absorption of the air, contained within the sinus, with a resulting negative pressure rendering the walls sensitive. The headache though frontal is occasionally referred to the external angular process of the frontal bone. This type of headache is characteristically present in the morning, becoming worse with the use of the eyes for near work. However, there are cases in which headaches are only precipitated by the use of the eyes for near work.

Unlike headaches due to eye-strain, and which are generally a daily occurrence, vacuum headaches characteristically appear at irregular intervals and may disappear as suddenly as they appear. Just as in empyema of the frontal sinus, this type of headache is increased on stooping and often attended by a sense of dizziness. Ewing's sign, "tenderness of the upper, inner angle of the orbit at the point of attachment of the pulley of the superior oblique muscle and internal and external to it" is pathognomonic of the condition. As the function of this muscle is to turn the eye downward and inward, it is called into play during the act of accommodation, necessitating a tugging at the tender point. The tenderness of this area is explained by Sluder "as arising from a closure of the outlet of the frontal sinus, thereby producing a negative pressure through absorption of the oxygen therein contained, with a resulting congestion of the lining membrane together with the underlying bone." Tenderness of the eyeball to backward pressure, a clinical sign to which but little attention has been given, is almost always present.

The nasal conditions that may give rise to vacuum headache Sluder groups into the following classes: (1) When there exists an enlargement or tilting of the septum tubercle out of the midline in a normal or particularly narrow nose; (2) narrowing or occlusion of the hiatus semilunaris through anatomical variation so that the uncinate process and bulla are in contact; (3) edema of the vault of the middle meatus; (4) anatomical insufficiency of the vault; (5) middle turbinate hypertrophy; (6) empyemas or coryzas that have gotten well, but have left a degree of swelling in the vault of the middle meatus sufficient to keep the frontal sinus closed.

In view of the fact that this malady has a nasal origin, generally without a demonstrable gross anatomical or pathological change, it is difficult at times to convince oneself that this is the proper diagnosis in a given case even when there is present Ewing's sign, a tender eyeball and a history

of periodic attacks. Fortunately, vacuum headaches lend themselves readily to a reliable therapeutic test. If a patient appears during an attack of headache it is his custom for diagnostic purpose to place a pledget saturated with 1:1000 adrenalin or an astringent beneath the middle turbinate for a few moments. If after a short time the headache disappears, or is diminished in its intensity, it is strong presumptive evidence that this symptom is due to insufficiency or lack of aeration of the frontal sinus. Treatment consists of applications of astringents to the region of the nasofrontal duct, and when this appears inefficient or inappropriate, surgical procedure for the purpose of removing pathological or purely obstructive tissues.

From a differential diagnostic standpoint headaches due to eye-strain will not be contrasted with those arising from empyemas or hyperplastic conditions of the paranasal sinuses. It is enough to say that so intimate is the anatomical relationship between the eyeball and the accessory sinuses that an examination of the former should be accompanied by a routine examination of the latter. If this is carried out, usually enough pathological evidence will be found within the nose to stamp a headache arising from this source.

Artificial Pneumothorax Statistics.

In an editorial on this subject, the *Lancet* of April 26, 1924, remarks that it is doubtful if the combined statistical evidence of many workers is as valuable as that of a single worker or institution, even if the figures of the latter are comparatively small. But on behalf of pooled statistics it may be claimed that individual lack of judgment and excess of enthusiasm are less likely to obscure the issue than when we have to depend on one worker for all our information. The problem is much the same as that of choosing a milk-supply from one cow or a large herd; if the one cow be diseased, it would be better for the consumer if he drew his milk-supply from a large herd with only one or two diseased cattle. A good sample of the large herd, or pooled statistics, is to be found in a paper by Maendl, of Grimmenstein, who has collected the experiences of his fellow workers in much the same way that Burrell and MacNalty collected, under the auspices of the Medical Research Council, the work done in England on artificial pneumothorax.

Maendl addressed a questionnaire to 180 specialists and hospitals in Germany, Austria, Czecho-Slovakia, and Switzerland, and he obtained answers and statistically suitable information from 29 doctors. He was thus able to add more than 1000 cases to his own not inconsiderable material of 300 cases, and of the total thus obtained there were 1330 cases in which the treatment had been completed, the pneumothorax having been started two to twelve years earlier. With regard to the permanent successes achieved, there were 784 cases in which information on this point was obtained, and among them there were 524, or 66 per cent, in which the improvement effected had been lasting. It was so in 49 per cent of 172 of Maendl's own cases. With regard to the significance of a pleural effusion complicating an artificial pneumothorax, he shares with Muralt and Koeniger the opinion that such an effusion may be a sign of good prognosis. Of 70 patients who were still alive from two to twelve years after the induction of a pneumothorax, 38, or 54 per cent, had developed such an effusion while the pneumothorax still existed. Of 15 patients who had achieved clinical recovery, maintained for two to ten years, as many as 11, or 73 per cent, had developed a pleural effusion.

If a pleural effusion is really as beneficial as these statistics suggest, it would be natural to provoke such effusions artificially —and nothing would be easier with the help of a little tincture of iodine or other irritant—in the course of lung collapse treatment. But the case for such a procedure would have to be made out much more convincingly than it has been at present. It is satisfactory to note that there

were only 15 cases of gas embolism, none of which terminated fatally, among the cases collected by Maendl.

The Use of Ethylene for General Anesthesia.

In the *United States Naval Medical Bulletin* for April, 1924, Moots states that like other anesthetics there is considerable variation in the required dosage of ethylene as well as the time required to secure relaxation, and not the same degree of anesthesia is secured in different subjects. So that, while it is not difficult to administer, one should carefully watch the patient for any signs, especially those pointing toward depression of the respiration or the circulation, until more is learned of its action, peculiarities, and advantages.

In most of his cases, ethylene lowered the blood-pressure as well as the pulse and respiratory rates, as compared with the patient's previous reaction under nitrous oxide and oxygen. In others, however, the opposite effects were observed, but no cases of shock thus far have been encountered.

Ethylene produces an exaggerated pink color in the skin and rarely exhibits cyanosis with relatively low mixtures of oxygen. When there is a change in color, it is more of a dirty or ashy hue than the blue or purple seen with the extremely full-blooded, red-faced individuals taking nitrous oxide.

No alarming symptoms have been seen in his cases, and while the odor is disagreeable to the operating-room staff, and may be detected on the patient's breath for two or three days afterward, the patient does not notice it and is not often nauseated nor vomits. In this respect it is apparently far superior to ether.

In most cases relaxation was very satisfactory under ethylene. Upon first opening the abdomen, the relaxation appears to be even more than is obtained by ether, but soon after abdominal manipulation the muscle seems to recover some tone. In two cases he was compelled to return to gas-oxygen to complete the operations as the relaxation was not sufficient.

His preliminary observations seem to Moots to warrant the following conclusions:

Disadvantages.—1. It is inflammable and should not be used with a cautery or electric spark in the same room.

2. The odor is garlic-like and unpleasant, but not pungent or irrespirable as ether is in such concentrations.

3. Respiro-cardiovascular depression is more than with gas-oxygen, but less than with ether.

Advantages.—1. Relaxation is generally quite satisfactory.

2. Anesthesia is quickly produced, almost as rapidly as with gas-oxygen, but recovery is somewhat slower.

3. Nausea is less frequent than after ether.

4. It is not difficult to administer.

5. It promises an improvement over ether and may be an aid to gas-oxygen.

Treatment of Pertussis by Ether.

In the *Ohio State Medical Journal* for May, 1924, Drake states that mostly through accident the use of ether, injected intramuscularly, was suggested. The results were beyond expectation. The duration of the disease was reduced to an average of three and one-half weeks; the number of paroxysms was reduced by one-half after the first injection, and the whoop disappeared usually before the end of three weeks. Vomiting ceased after one or two injections.

The serious complications were absolutely aborted, and in cases which were seen late with bronchitis and bronchopneumonia the affection was aborted in a few days.

An illustrative case is that of a girl, aged six, with pertussis of six weeks' duration, coughing frequently, vomiting, and with considerable emaciation. Her temperature was 103.2°, pulse 130, respiration 44, and the chest full of moist râles. Two cubic centimeters of ether was given intramuscu-

larly, and when she was seen twenty-four hours later the temperature was normal, pulse 90, respiration 24, and the chest normal. She received two more injections of ether, and returned to school two weeks later.

In children under one year of age, intramuscular injections of ten minims to one-half cubic centimeter were used; from one to three years of age, one-half to one cubic centimeter; and over three years of age, one cubic centimeter to two cubic centimeters. The injections were given on alternate days, five being the largest number necessary. The site of election was usually the gluteal region. The injections were painful only while injecting, and there were no reactions at the site of the injection.

A fleeting paleness with dyspnea was noted in small babies. Drowsiness and sleep gave evidence of its anesthetic properties.

Anesthesia and antispasmodic action were clearly observed. Excretion was for the most part by the lungs. Repeated urinalyses gave no evidence of renal irritation.

The use of ether opens a wide field for practical experimentation. It is of known value in cases of persistent hiccoughing; it has been used successfully in tuberculosis, especially abdominal tuberculosis. One of his colleagues reports a case of bronchopneumonia in an adult in which the temperature dropped to normal in two days, and the chest cleared in four days. Its usefulness is suggested in controlling the cough of the tuberculous, and the control of bronchial asthma and spasmodic croup.

Luminal Sodium in the Treatment of Hyperemesis Gravidarum.

In the *New Orleans Medical and Surgical Journal* for May, 1924, MILLER states that for the last year he has been using luminal sodium in all cases in which the vomiting of pregnancy was not amenable to simple measures, and so far he has had unqualified success. To date he has used the treatment in ten patients. Five were retaining possibly a third of the food ingested, but were losing strength and weight. The other five were undoubtedly instances of pernicious vomiting, but whether toxic or neurotic he cannot say. All of the latter group had been under hospital treatment in other services and had had the routine measures of proctoclysis, hypodermoclysis, glucose infusions, starvation treatment and glandular therapy, with little or no result. One of them, at least, was quite as ill as any patient he ever saw under the same circumstances in a public service. The same treatment was employed with all. Two grains of luminal sodium was given one hour before each meal, with the same dose at bedtime, all by mouth except in three cases, in which the first doses were given by hypodermic, and the patient was instructed to resume her ordinary diet. In one case, about three-quarters of the food taken during the first twenty-four hours was retained, after which there were no further attacks of vomiting; in every other case the relief was immediate. Within a week they had all gained weight and strength, their color was improved, and their outlook on life was very different. The number of doses was diminished after four or five days, and within three weeks the drug was discontinued entirely. In no instance has there been a recurrence of the trouble. At the present writing five of the patients have been delivered without difficulty of live babies, and the others are within one or two months of term.

The only untoward symptom following the administration of the drug was one case of urticaria, which was relieved by applications of soda paste. Several patients stated that they had had wild dreams, but none complained of restless nights due to drowsiness during the day, which Luikart mentioned as an objection in his report.

He can give no explanation for the success of luminal sodium in the treatment of this condition except that it checks the pylorospasm, which he believes is largely responsible for the trouble. There may also

be an indirect effect on the nervous system. He has not, of course, used it in a sufficiently large series of cases to make any statements of value concerning it, but he asserts it has been the most satisfactory agent he has found to combat this always annoying and frequently serious complication of pregnancy.

Two Methods of Washing Eczematous Hands.

GLAZE, in the *Archives of Dermatology and Syphilology* for May, 1924, states that for cleansing acute eczematous surfaces, soap and water have long been anathema. Texts uniformly recommend, and the physician in turn dubiously advises: Cleanse the affected areas with oil of sweet almond, olive oil, cold cream, petrolatum, or boric acid lotion.

As a matter of fact, it must be admitted that with the most careful technique these agents prove unsatisfactory, and it is with reason that their use is undertaken half-heartedly by most patients, to be abandoned at the earliest possible moment.

The simple method outlined by Glaze is genuinely detergent and actually soothing on its own account. Its novelty appeals to most patients, who are intrigued with the idea of "making mayonnaise dressing," and the fidelity with which it is carried out testifies much for its ease of performance and effectiveness.

When advising a person with irritable eczema of the hands as to cleansing, he is told to avoid soap altogether, and asked to provide himself with oil of sweet almonds or olive oil, preferably in a shaker of the kind used by barbers to sprinkle liquids on the hair, and, in a separate container, the yolk of an egg. A liberal quantity of the oil is to be poured into the palm and thoroughly but gently smoothed and worked into the skin of the hands; this done, a small portion of the yolk (the yellow part of one egg will serve for from twenty to thirty cleansings if used economically) is added, and the two briskly worked into an emulsion exactly after the manner of lathering the hands with soap. The addition of a few drops of water aids at this stage, producing a thin, creamy white to dark suspension, according to how badly the hands are soiled. The parts, rinsed now with cool water, are left soft and clean, without visible oiliness when dried. After a few essays patients become adept, and can perform the operation as quickly as with soap and water. He has found the plan of demonstrating the procedure to a prospective user excellent.

For cured cases of eczema of the hands, or for persons with unduly dry skins and a tendency to chapping in cold weather, trial has proved the following modification of the oil and egg method valuable. The liquid almond or olive oil is first thoroughly worked into the skin, and then, instead of the egg yolk a mild soap is employed, using just enough, together with sufficient water, to produce a milky saponified emulsion without lathering. Rinse with cold or cool water. By this means the skin is largely spared the ill effects of the alkali, as clinical results in the prevention of chapping demonstrate.

Acute Otitis Media.

STOTTER, in the *Ohio State Medical Journal* for May, 1924, states that as the symptoms may be differentiated into stages so the treatment must vary accordingly. A definite routine cannot be followed for every case, but in general one may suggest:

During the first stage rest in bed is of paramount importance; locally 3-per-cent phenolglycerin, heat or cold depending on which gives the patient greater relief. A brisk-acting cathartic, as calomel in divided doses, excess of fluids, and control of pain by sedatives. The nasal mucous membrane should be painted with a 4-per-cent cocaine solution to which a few drops of adrenalin have been added. These measures are entirely palliative and have no curative value whatsoever.

With the onset of the second stage resort

is had to paracentesis. The details of this are unnecessary, as the wide posterior incision from below upward is generally accepted as superior to puncture. If possible it should be done under gas or ethyl chloride anesthesia. If necessity demands local anesthesia, the following may be used:

Menthol, gm. 2.0;
Liquid vaselin, gm. 100.00;
Chloretone, gm. 8.0;
Cocaine, gm. 2.0.

A word of caution must be said regarding promiscuous incision before the indications are manifest because an uninfected ear is often made to discharge and go on to a chronic state upon incising the drum. Immediately upon paracentesis the discharge should be cultured. Gently cleanse the canal every three to four hours with cotton swabs, depending upon the amount of the discharge. Insert gauze wick drains. The gauze should be cut about one-half inch wide by four inches long and folded upon its long axis. Inasmuch as removal of the wick cleanses the canal, very little additional manipulation is necessary; however, to avoid furunculosis the meatus may be touched with a 5-per-cent silver nitrate solution followed by a thin film of vaselin once daily. The foregoing treatment is carried out for three days and the amount of discharge noted. If it is profuse and thick, irrigations should now be started.

As the effect of the irrigations is almost entirely mechanical, the solution used is of little consequence—boric acid, potassium permanganate, bichloride of mercury, etc. If the secretion is profuse and tenacious, frequent irrigations are required, once every two or three hours, less often as it diminishes, and then again a return to the dry cleansing and gauze wicks. In the intervals between the irrigations or cleansing, radiation should be used with a high powered electric globe every hour for fifteen minutes. As the majority of cases of acute otitis are secondary to a nasopharyngitis, it is advisable to treat this primary condition as soon as the purulency of the middle-ear secretion is established. This may be done by painting the mucosa of the nose and of the nasopharynx with a 5-per-cent silver nitrate solution, or by means of nasal irrigations with a mild alkaline solution such as a few drachms of sodium chloride and sodium hydroxide to a pint of water. The antiseptic effect of this is *nil*, but its value lies in washing the infectious material present in the nasopharynx out through the natural channels. Furthermore, if a weak astringent is added the congestion of the tissues is greatly relieved. The dangers of postnasal irrigations are evident, but in the condition in question the middle-ear cavity is already infected and very little if any fluid can be forced in in this manner, and the benefits greatly outweigh the dangers. As a precaution, however, the head should be held forward—chin on chest, with mouth open. Children can be held face downward during irrigation. These irrigations are carried out during the first or at most during the first and second weeks of the second stage, and three times daily.

During the fourth stage, and with the abatement of the symptoms, politzerization is instituted to drive the remaining secretion from the middle ear.

A complete radiographic study should be made throughout the course of the disease. This more than anything else gives an index because it tells the degree of destruction of the cells and anatomic relations of the sinus. In all cases of acute otitis media the mastoid cells appear cloudy, but when the anterior sinus wall casts a shadow one should look for destruction of the cell walls.

He concludes:

1. An acute otitis media is of moment because of the complications which may supervene.

2. In the great majority of cases the etiological pathology may be found in the nasopharynx.

3. The course may be divided into four distinct stages.

4. Inasmuch as the etiological factor is oftentimes found in the nasopharynx, treatment of this area should be instituted.

5. The treatment is largely palliative and should be governed by the local symptoms.

6. Major surgical intervention is indicated when these palliative measures do not relieve.

The Treatment of Eclampsia.

BECK, in the *Long Island Medical Journal* for May, 1924, reminds us that believing that the interruption of pregnancy removed the cause of eclampsia we formerly treated all of our cases in a most active manner. Our first thought was to deliver the child as quickly as possible. To accomplish this we resorted to the use of Cæsarean section, vaginal hysterotomy, incisions of the cervix, bag induction, forceps, and version and extraction. As our results were much worse than those reported by the advocates of a more conservative routine, we felt that we should give their methods a trial in our clinic. For the past several years, instead of centering our attention upon the immediate delivery of the child, we have limited our treatment to the use of such measures as might increase elimination and lessen the irritability of the nervous system. The histories of all of the eclampsias admitted to the Long Island College Hospital during the past five years have been carefully studied, and the observations made either at the bedside or in the collective study of these records form the basis of his paper.

One of the most striking of these observations is the fact that we frequently aggravated the condition by including in our routine procedures of questionable value which in themselves were the exciting cause of convulsions. The irritability of the nervous system is so increased during eclampsia that very slight external stimuli may bring on convulsions. This was particularly noticeable when gastric lavage and colonic irrigations were given. In over half of the cases in which a stomach tube was passed a convulsion resulted from the procedure. Frequent catheterizations likewise caused frequent convulsions. Many times the convulsion was brought on by the manipulation required in the taking of the blood-pressure. As a result of these observations he has abandoned everything that is not absolutely necessary, and in addition has attempted to protect the patient as much as possible from external stimuli.

In the matter of increasing elimination opinions have changed considerably. Formerly much reliance was placed upon catharsis, gastric lavage, frequent colonic irrigations, and sweating. More recently, as a result of the work of Lichtenstein, phlebotomy has been used as an additional measure. The excellent results which have followed the use of this procedure have led us to consider it as the best means of increasing the elimination. In fact he has been so favorably impressed by this measure that he no longer feels the need for gastric lavage, and has limited the use of colonic irrigations to once in twenty-four hours instead of every six hours as was formerly the custom. The phlebotomy is done immediately after the first convulsion that occurs in the hospital; 1000 cc of blood are withdrawn through a paraffin-coated needle from the median basilic vein. If the blood-pressure falls to 100 or the pulse rapidly rises the phlebotomy is discontinued. Otherwise the full 1000 cc are withdrawn.

To lessen the irritability of the nervous system morphine has been used exclusively. One-half grain of this drug was given immediately after admission and repeated in quarter-grain doses at intervals of one hour until the respirations were lowered to 12 per minute or the convulsions ceased. At times large amounts of morphine were given with no deleterious effect either on the mother or the child. Since he has been using early large phlebotomy much less morphine has been required.

During the past five years treatment as above outlined has been followed in most of his cases. The morphine routine alone was employed in nine, with a maternal mortality of 22.2 per cent and a fetal mortality of 50 per cent. In three additional instances phlebotomy was done as a last-resort measure. These three mothers died. When morphine was given together with early phlebotomy only one mother in this group

of 14 cases died. Cæsarean section was done four times without any fatality.

While this series is too small to warrant any conclusions as to the methods employed, they point toward the value of conservatism in the treatment of eclampsia. This is especially true of the group that had early large phlebotomy. In his clinic he has never been able to obtain as satisfactory results by any other method of treatment.

Results of Treatment of a Series of Eclampsia Cases.

Treatment.	Maternal Mortality.	Fetal Mortality.
Morphine routine.	2 deaths in 9 cases. 22.2 per cent.	4 deaths in 8 cases. 50 per cent.
Morphine and late phlebotomy.	3 cases, 3 deaths.	2 deliveries, 1 death.
Morphine and early phlebotomy.	1 death in 14 cases. 7.1 per cent.	5 deaths in 9 cases. 55.5 per cent.
Morphine and Cæsarean section.	4 cases, no deaths.	50 per cent mortality.

Tuberculosis of the Larynx.

St. Clair Thomson, in the *British Medical Journal* of May 3, 1924, states that the effects of a sanatorium life on a diseased larynx are remarkable. Those who can recall the appearance of tuberculous laryngitis in an out-patient clinic twenty-five years ago, and the hopeless efforts to ameliorate it, must be struck by the improvement, up to a certain point, which is wrought simply by the sanatorium principles of unvitiated air, regular rest and exercise, abundant and suitable food, and constant medical supervision. To these may be added, when the larynx is involved, the cessation of tobacco and alcohol, diminution or absence of use of the voice, and the control of useless cough. He has no customary or regulation sprays, insufflations, injections, inhalations, or paints for tuberculous laryngitis. In the uncontaminated air the larynx becomes so clean under the general conditions that these local measures are seldom called for and may be injurious. The local measures which he employs are only used for the treatment of symptoms, the chief of which is cough.

He asserts the treatment of laryngeal tuberculosis must be based on the assumption that it is but a complication of the original tuberculosis in the chest. In addition, however, to the systematic treatment of an open-air sanatorium there are three special methods—namely, (*a*) silence, (*b*) whispers, and (*c*) the galvanocautery. As is well known, he was one of the first to point out the therapeutic value of voice rest. This method is strongly indicated in all recent and acute cases of laryngeal tuberculosis; chronic and old-standing cases, even when limited to the margins of the glottis, appear to do as well under whispers. He has seldom prescribed silence for more than six months, for if not healed by that time the case is not going to clear up straight away, and if other conditions are favorable the use of the galvanocautery then promises a speedier cure. In the 67 patients for whom strict silence was prescribed, the following results were obtained: 23, or 34.3 per cent, were cured, 1 was much improved, 19 were improved, 16 left the sanatorium *in statu quo*, and 8 were worse. The 23 cures were obtained in a total of 477 laryngeal cases, a proportion of 4.8 per cent.

Of the 477 cases, 336 had no special treatment beyond being required to speak only in whispers. This alone led to a cure in 50 cases, or an average of 14.8 per cent, 12 were much improved, 84 were improved, no benefit was obtained in 168, and in 22 local conditions became worse. It was, of course, for the more advanced and less hopeful type of case that whispering was prescribed.

Thomson employs a cautery with a fairly sharp-pointed platinum tip, the object being to penetrate swiftly through the margin of the diseased area so as speedily to reach the deeper, healthier area. The object is not, as is often thought, to burn away the diseased tissue, but to stimulate inflammatory and limiting fibrosis in the circumambient healthy area. Of the 477 cases in which tuberculosis was found in the larynx during ten years, 74 were thought to be suitable for treatment by the

galvanocautery and a cure was obtained in 46 cases; in addition, 3 were much improved and 22 improved, while in no single case was the local condition aggravated by the treatment.

To sum up the results of his methods of treatment at Midhurst, of the 477 cases of laryngeal tuberculosis 23 recovered with strict silence, 50 on whispers, and 46 were arrested by the galvanocautery. This gives a total of 119 cures, or 24.9 per cent, from all three methods combined, which, compared with previous records, is a result which is very encouraging. As half the cures were obtained without local medication or any specific treatment, it may be hoped that new therapeutic measures may soon be forthcoming to stimulate further this tendency to spontaneous healing under hygienic conditions.

Surgical and Genito-Urinary Therapeutics

Non-operative Treatment of Recent Fractures of the Femur.

MEYERDING *(Minnesota Medicine,* May 19, 1924) observes that seventy-five per cent of cases of fracture of the femur at the Mayo Clinic present malunion, non-union, delayed union, chronic osteomyelitis, or joint stiffness following treatment elsewhere. A study of the causes of such failure demonstrates incomplete reduction and imperfect fixation or retention when first treated. Infection in compound or operative fractures often results in malunion and osteomyelitis. Improper internal fixation and inefficient postoperative retention or external fixation are not uncommon. Failure to recognize fractures of the femoral neck and too early weight-bearing are occasional causes of non-union and coxa vara. Henderson has reported 1000 cases of old fractures, 221 of which were of non-union of the various long bones. Of 120 cases of ununited fracture of the hip, only twenty-six were considered surgical; ninety-four patients were dismissed since their condition was considered non-surgical. Henderson says: "There is no reason why, in the majority of cases, bony union cannot be obtained in the neck of the femur, if proper fixation is provided after reduction of the fracture." In 222 consecutive cases of fracture of the femur, 57 were recent; the remaining 165 were malunited or ununited, the result of treatment elsewhere.

The routine examination and treatment used at the clinic in all cases of fracture are as follows:

A roentgenologic examination is made on admission, before the application of permanent apparatus, and after applying a temporary splint to relieve pain. A general examination is made, and the history taken, if possible, while the Roentgen-ray plates are being developed. As soon as possible after ascertaining the type and location of the fracture, anesthesia is given, and the fracture is reduced. Roentgenograms are made following reduction and application of apparatus, as a record. The apparatus is examined several times daily to insure proper function. Measurements are recorded from time to time, as shortening indicates bowing or slipping by of fragments. The circulation is watched, as tight-fitting apparatus interferes with rapid union, makes the patient uncomfortable, his joints stiff, and so forth. Roentgenograms are made on the fifth day, and repeated at intervals thereafter. The patient is treated on the Bradford frame and apparatus, which can be raised and lowered for the use of the bedpan, for transportation, and so forth, thus aiding the maintenance of reduction by eliminating strain. The union is tested to corroborate the Roentgen-ray findings with regard to union before the patient is dismissed.

Fractures of the femoral head, neck, or

trochanter are followed by long convalescence, and not infrequently by permanent partial disability, due to stiffness of the knee, fibrous union or non-union, and shortening. For fractures of the head and neck, the Whitman reduction and fixation method is used almost exclusively in the clinic; it affords excellent results, and is applicable in most instances. Once the Whitman cast has been applied with proper reduction, little care is required, other than prevention of pressure sores over the sacrum and stiffness of the knee. The cast is applied from the mid-thorax to the toes on the affected side, and to the knee of the sound leg; a large window is left to permit massage of the patella, and the sacrum is well padded with soft felt. Care is taken to maintain the lumbar curve. After six or eight weeks a pair of metal joints are placed on either side of the knee, and held by plaster until firmly fixed; enough plaster is then cut away to allow motion at the knee, thus preventing the stiffness at the joint sometimes noted. Casts are changed when the surgeon deems it necessary; usually the sound leg is allowed to remain out of the cast at the end of three months. Abduction is maintained with internal rotation and extension until union is firm. A walking caliper is useful during the first ambulatory months, and should be so applied as to take weight off the femur and put it on the ischium. During treatment, foot-drop should be prevented by keeping the foot at right angles to the tibia.

From two to four months for children, and from five to seven months for adults, may be required in order to obtain a satisfactory result. Recumbency is not necessary during the entire period. The patient should use the Thomas walking caliper splint as soon as, in the judgment of the surgeon, he is fit to walk, and union is firm.

Fractures through the trochanters respond to traction well, and with the use of the Thomas splint excellent results are obtained. The limb should usually be placed in a position of abduction, and sufficient traction maintained to secure equal length. The degree of union, which is usually rapid, is best judged by the aid of roentgenograms. The walking caliper, fitted so as to take off weight in the ambulatory stage, is excellent. Traction is obtained by adhesive plaster, Sinclair glue, the ice tongs, or the Steinman pin.

Fracture of the greater tochanter or separation of its epiphysis is uncommon, and may usually be treated by fixation in abduction with a firm pad over the site of fracture. When marked displacement is apparent following fixation, open operation may be resorted to.

Fractures of the femoral shaft are usually transverse, the upper fragment being carried forward and outward with slight external rotation. Traction in the axis of the upper fragment is usually sufficient to overcome shortening, and will reduce the fracture unless interposition of muscle has occurred. It is better to reduce the fracture and apply the apparatus under anesthesia, as this gives the surgeon an opportunity to manipulate thoroughly, to stretch muscles, and to apply traction painlessly. Temporary traction to prevent shock or further damage to soft tissues is indicated during transportation. The Thomas splint should be carried in all ambulances and be available in hospitals for emergency purposes. The temporary traction is readily applied in emergency practice with the Thomas extension splint. Such care lowered the mortality in cases of compound comminuted fractures during the war, and saved thousands of useful limbs.

Operate for open reduction when, after reasonable effort, the Roentgen rays show unsatisfactory position, and the time since fracture has been short. Such operations should be performed before organization of the clot or callus formation.

Although the Thomas splint has, to a large extent, supplanted the lateral splint, plaster of Paris, and Buck's extension, nevertheless they are still used occasionally. In children, fractures of the shaft are successfully treated by the Bryant suspension.

Traction may be obtained by means of

adhesive plaster or moleskin, Sinclair glue, plaster cast, Hodgen's splint and pressure against the calf, ice tongs, Steinman pin, or the Finochetto stirrup. In most instances skin traction may well be extended beyond the site of fracture, as skin is elastic and gives readily; this is especially true when anesthesia is given, and reduction and traction made before the extension apparatus is applied. The skin should be prepared by shaving and washing to remove hair and grease, and the adhesive changed occasionally to prevent irritation.

Care should be taken when adhesive extends over the peroneal nerve, and pressure over the malleoli should be avoided.

In fractures of the lower shaft and condyles, the upper end of the lower fragment is practically always displaced backward, the sharp edge of the fracture resting on the nerves and blood-vessels. Anesthesia is essential in reduction, to relieve muscle spasm. Pressure is to be avoided over the fractured ends, lest more injury to soft parts be produced. Gradual traction, with the knee partly flexed, and the assistant bearing down on the shaft above the fracture while the surgeon forces upward with his hand under the condyles, will usually accomplish reduction. The great advantage in using the ice tongs or Steinman pin in fractures in the lower femur lies in the avoidance of stiffness in the knee. Charbonnier has obtained satisfactory reduction with the Steinman pin in 85 per cent of his cases, with no serious after results, union taking place in from twenty-five to fifty days, and Dennis Crile reports 300 cases reduced without difficulty. The insertion of these appliances in fractures of the lower shaft should be anterior to the middle axis of the femur, so as to pull the upper end of the lower fragment forward.

Unless intra-articular fractures are perfectly reduced, they lead to permanent partial disability, and therefore the use of conservative splints, casts, and so forth, is fast losing ground in favor of open reduction and internal fixation.

The author's method of caring for compound fractures may be summarized as follows:

With a sterile gauze pack, saturated in Dakin's solution or iodine, over the wound, the surrounding skin is shaved and cleansed. The protruding bone and tissue are thoroughly washed with a large quantity of Dakin's or a solution of iodine. The soiled tissue and small fragments of bone are excised. The fracture is then immediately reduced, under anesthesia, and suitable apparatus applied. If the wound has been extensively soiled and the surgeon does not believe he obtained a clean wound by the foregoing measures, the wound is Dakinized and packed for forty-eight hours. The wound is then allowed to close of itself, or is loosely sutured and left alone. Fifteen hundred units of antitetanic serum are given. Intra-articular wounds are not Dakinized. Iodine may be used instead of Dakin's solution to cleanse or wash the wound before and after débridement.

The Treatment of Angina by Surgical Methods.

WENCKEBACH *(British Medical Journal,* May 10, 1924), after a somewhat lengthy discussion of the causes of anginal pain, observes that we should search for the pathway which carries pain stimuli from the proximal aorta to the spinal cord, and having cut it blocked this path.

The proposal to extirpate part of the sympathetic cardiac nerve system to abolish pain is not new. Long ago the idea occurred to Francois Franck; it was put into practice for the first time in 1916 by Jonnesco of Bucharest, who before then had gained a wide experience of operations on the cervical sympathetic system. His first operation for the relief of angina was a complete success, but for a long time no further cases were undertaken.

Our idea of angina pectoris, based on Clifford Allbutt's conception of it, leads us to attach an ever-diminishing significance to heart failure and to disease of the coronary arteries, and an ever-growing importance to the afferent nerve supply of the

proximal aorta. It has been known for long that the depressor branch of the vagus is the principal afferent nerve of the proximal aorta. It seemed, therefore, worth considering whether a resection of the depressor branch of the vagus might be the means of abolishing the pain of angina.

There is no curative treatment of angina. It is true that cases may improve; by adopting reasonable habits of life patients may successfully stave off attacks; but in the majority of cases, sooner or later, the attacks come back. Normal life becomes impossible and may ultimately become a drawn-out agony. The attacks themselves damage the heart further, hasten the progress of various affections of the organ, and often kill the patient.

The depressor nerve, discovered by Ludwig and Cyon, is a branch of the vagus, one root splitting off from the main trunk, while the other issues from the superior laryngeal. There is proof that this nerve, on stretching of the aortic wall by high blood-pressure, brings about a rapid fall of pressure, thus relieving the stress on the aortic wall. Tschermak, who was one of the first to carry out a systematic investigation of the depressor nerve, published only recently the results of renewed experiments. As far as it is possible to tell, the depressor has its distribution confined to the proximal part of the aorta. Tschermak is still of opinion that the depressor nerve is the only sensory nerve of the aorta, and admits that its stimulation may give rise to sensation and to pain. Another effect of stimulating the depressor is slowing, or even arrest, of respiration. Here the curious respiratory phenomena of angina pectoris, which includes difficult breathing or even the lack of any desire to breathe, find a rational explanation.

Eppinger and Hofer, convinced of the aortic origin of angina, made an exact study of the topography of the depressor nerve in man and animals, and on the knowledge thus gained applied the operation of section of the depressor to a case of severe angina (August, 1922). In this case there was pain both on the left and right sides of the body. The operation was carried out on both sides of the neck. The depressor nerve was differentiated and recognizable on both sides. The result was most gratifying; both attacks and pain vanished at once. The patient had good health after the operation.

Section of the depressor nerve for relief of angina has now been performed on some fourteen cases. The chief results which emerge from these cases are: The operations were well borne; no complications occurred. Two patients died. In the first case of double-sided angina, resection of the left depressor gave a perfect result. At the second operation, performed on the right side, no isolated depressor nerve was found; the vagus was divided below the point of origin of its inferior laryngeal branch. The pain disappeared, but a fortnight later the patient died suddenly without obvious cause of death. In a second case of right-sided angina no depressor was found. In this case "sympathectomy" was performed—an operation which has been performed for angina with varying degrees of success. In this case extirpation of the whole sympathetic cord was followed by a rapidly developing failure of the heart. Five hours after the operation the patient died of pulmonary edema.

In all those cases in which the depressor nerve appeared in its individualized form, as described by Tschermak and others, the pain disappeared at once on the side operated on, and in most cases the success was enduring. Further, it was observed, where there was an opportunity of comparing the two sides, that the left nerve was thicker than the right. Failure resulted in those cases in which the depressor fibers were not isolated to form a separate trunk.

A detailed analysis of the individual cases brings out in quite a striking way the beneficial effects of dividing the depressor fibers. If a depressor trunk was recognizable its section gave immediate and complete relief. The effects of operation on one case of angina duplex were very instructive. The

patient had clearly marked segmental areas of exquisite hyperalgesia on both sides of the body. Some days after an operation on the left side—a well-marked depressor nerve being encountered and divided—the hyperalgesia had completely disappeared on the corresponding side of the body, but on the opposite and unoperated side the areas gave the old reaction when pinched or tested by pin-prick, the right-sided hyperalgesia ending sharply at the midline over the sternum.

Quite apart from the bearing such a case has on the possibilities of operative treatment for the relief of angina, we obtain, in this instance, evidence of a kind which we cannot hope to elicit by experiments on animals. We have here definite proof that the left depressor nerve was the sole pathway for the impulses which gave rise to anginal pain and all its sequelæ. Knowing that this nerve has its distribution in the proximal aorta, we must conclude that, at least in such cases, the starting-point of the pain and of the attack is situated in this structure and in no other.

Operative Treatment of Fractures.

COTTON *(Illinois Medical Journal,* May, 1924) believes that fractures should be treated by young general surgeons, trained to operate only when operation is needed, trained to work for end-results only, trained to skill in non-operative work, trained to combine eagerness with patience.

Operative work on fractures has a place; permanent, valuable. It has been discredited by the effort of untrained men, facile operators, to throw the whole of fracture work into the operative field where it doesn't belong.

This furore has begun to wane. We are in position now to evaluate this thing with some accuracy.

Fractures in the next decade are going to be better treated with commensurate results.

In the meantime we may lay down certain broad rules. Never operate unless the outlook on a non-operative basis is bad, or unless you can make it better. Do not operate to get a better *x*-ray picture. Keep one eye on form. Keep both eyes on function.

As to delayed union, many need not operation but skilled treatment. Others (what Cotton has called the displacement class) need reposition and fixation; often temporary plating; grafts usually superfluous.

Others need bone stimulus, bone bridging.

Refresh, pack and splint in small grafts; fix by splinting.

Intramedullary or inlay "grafts" live or boiled belong to exceptional cases only.

Treatment of Deafness.

KERRISON (*Medical Journal and Record,* May 17, 1924) in discussing the current theories of local treatment, excludes all cases of chronic deafness due primarily to auditory nerve or labyrinthine defect or disorder.

The classical treatment is based for the most part on one or other of two time-honored theories of the mechanics of sound obstruction: It is assumed that an occluded tube, causing retraction of the drum membrane and venous congestion of the tympanic mucosa, is in large measure responsible for the deafness present; or that the drum membrane has become thickened, rigid, or in some way less mobile than in the normal ear, and therefore does not respond as normally to sound waves.

It is further assumed that any agency, *e.g.,* inflation or pneumatic massage, which causes forcible passive movements of the drum membrane will improve sound transmission. This is a particularly unfortunate popular misapprehension which in the past has to some extent beclouded the whole question of treatment. Exactly the reverse is true in the vast majority of cases.

There is, of course, a third and major factor in the pathology of obstructive deafness, *i.e.,* ankylosis or rigidity of the ossicular joints, and particularly, as in

otosclerosis, fixation of the stapes within the oval window. Such changes, however, are clearly beyond correction by any of the usual treatment measures.

The local measures in common use are so few in number as to be easily listed. Measures to relieve nasopharyngeal congestion; the use of bougies for tubal obstruction; medicated bougies for tubal congestion; Politzerization or catheter inflation to restore air-pressure equilibrium; pneumatic massage, supposed to "exercise" both drum membrane and ossicles, practically complete the list. With the possible exception of inflation, not one of these measures has any logical place in the treatment of deafness except as based on one or other of the two hypotheses stated above.

If the commoner types of deafness were associated with increased rigidity or stiffening of the drum membrane, the treatment, so far as it concerned this pathological feature, would be comparatively simple; for it would not be difficult by inflation or some form of pneumatic massage to lessen this rigidity. But experience has abundantly shown that treatment along these lines does not relieve deafness; and it would seem that this failure should have *per se* considerable weight as evidence that this theory of the mechanics of deafness is unsound.

The relaxed membrane argument is based on the proposition that relaxation of the drumhead is one of the commonest of pathological changes in obstructive deafness.

Every experienced aurist will admit that, barring the purest type of otosclerosis, retraction of the membrane is present in some degree in the vast majority of cases of tympanic deafness; also that the retraction in these cases is not a temporary condition, but usually of long standing. It is impossible to believe that a comparatively rigid and inelastic membrane can be stretched into an abnormal position and there retained over a period of months or years without undergoing some degree of structural change, *i.e.*, relaxation. Furthermore, if such relaxation did not exist, the drum membrane, when released by inflation or cocainization of the tube, would spring back into a perfectly normal position. As a matter of fact, such complete correction of position does not as a rule take place. If, from a consideration of these more or less obvious facts, we conceive of prolonged retraction and relaxation as being in a sense equivalent terms, we shall have little difficulty in accepting the theory of a relaxed drumhead as a common factor in the mechanics of sound observation.

In the progress of a chronic obstructive lesion, three consecutive factors in the production of deafness regularly arise: impaired transmission through relaxation of membrana tensa; reduced ossicular mobility through relative ossicular disuse; and slowly progressive acoustic nerve torpor through gradual cutting off of normal sonorous stimuli.

With a patient suffering from chronic obstructive deafness, the first inflations usually bring a sense of comfort and relief and may result in an appreciable gain in hearing. This is a quite logical result. The retracted position of the membrana tensa has been corrected and air-pressure equilibrium restored. The drum membrane, therefore, responds more effectively to sound waves and transmits these impressions, or movements, more effectively to the ossicular chain. The hearing is, therefore, temporarily improved. An apparently progressive gain in hearing is frequently obtained up to the fourth or, more rarely, the fifth or sixth inflation, after which we shall do well if we are able by this method to maintain the maximum limit so far obtained.

Of the ultimate results of inflation one cannot speak so favorably. The patient who is subjected to periods of treatment alternating with periods of rest usually shows quite marked variations in hearing power at different times. After several months without treatment he may have relapsed to the functional status of the first

treatment period, from which, however, a short course of treatment brings substantial recovery.

Finally there comes a time, perhaps in one, two or more years, when by careful tests the aurist's best efforts fail to bring the hearing up to the maximum limit of the first treatment period. As soon as this point is reached, *i.e.*, when the original peak of functional gain can no longer be reached, the retrograde sequence of events is definitely established. From this point the functional curve is downward.

Whoever under good illumination has studied the effects of Valsalva inflation or so-called massage as seen through a Siegel otoscope, cannot fail to have noted the great disparity in cases of deafness between the movements of the membrana tensa and those of the hammer handle. Even with moderate relaxation the two segments of the membrane are seen to execute quite extensive movements into the canal, while the movements of the hammer handle may be so slight as to be difficult to detect. Reasoning from this observation, it is clear that routine catheter inflations, acting in like manner, must sooner or later cause further anomalies of tension. If, therefore, we remember that in whatever degree the normal tonicity of the drumhead is lost, in like proportion will the influence of sound waves upon the ossicular chain be reduced, the effects of ill advised, or too forcible, or too frequently repeated inflations will not be difficult to comprehend.

The first step toward a rational scheme of local treatment—of any disease—would be a careful elimination of all useless procedure.

The first treatments should follow the usual routine, *i.e.*, catheter inflation at short intervals, preferably on every second or third day. Rapid hearing tests should be made before and after each inflation and the results accurately noted on the history card. These frequent tests are important and serve two purposes: to determine temporary variations of function; and, what is far more important, to gauge any cumulative or progressive gain in hearing which may result. The maximum hearing gain is usually obtained by the fourth, fifth or sixth inflation. As soon as it is clearly demonstrated that no progressive improvement is being made—*i.e.*, that the maximum result by this method has been reached—inflation as a routine measure should be discontinued. From this point more can be accomplished in the interest of permanent betterment of hearing by judicious treatment of the pharyngeal, or fibrocartilaginous, portions of the Eustachian tubes than by frequent inflations, and the drum membranes are thereby relieved of a strain which may cause further anomalies of tension and ultimately work quite serious injury to hearing.

Catheter inflation *per se* exerts no influence whatever of therapeutic value upon a chronically congested tube. If any influence be exerted, it is purely temporary; the frequent passage of Eustachian sounds or bougies does not materially help to restore a diseased tube to a normal condition. On the contrary, with allowance for exceptional cases of actual localized adhesions or constrictions, the frequent passage of even a small bougie through and beyond the isthmus may increase a tubal lesion and do positive harm.

If the foregoing conclusions are well founded, it follows logically that we shall obtain surer and quicker results, and in the final analysis accomplish more of permanent value to the patient, if we limit our treatment of the tube to the application of appropriate drugs; and this failing, to direct surgical measures for the reduction of chronic congestion, edema or hypertrophy of the pharyngeal end of the canal.

As to the method of application; it is hardly open to question that tubal disease begins usually or always in the pharyngeal end of the canal. Just as cocaine or adrenalin, applied to this portion, usually clears the whole canal, so astringents or other drugs, confined to this region, usually exert their influence throughout the entire length of the tube.

A larger percentage of tangible results is obtained from drugs confined to this restricted field than from the same drugs applied by sounds or applicators throughout the entire canal.

Aside from their convenience in cleansing the nasal passages, nasopharyngeal sprays have little or no value in treatment. On the other hand, periodical irrigations of the nasopharynx with a warm solution of normal salt or some mild antiseptic solution are of positive value in relieving nasopharyngeal and tubal congestion. Occasional postnasal irrigation with a warm solution of argyrol of two-per-cent strength is of unquestionable value in a very considerable proportion of cases.

The treatment mentioned, though exceedingly simple, is rational, theoretically constructive, and should help to stabilize whatever functional gain results from the short course of inflation.

More than we usually take into account, the drum membrane itself calls for direct attention in the treatment of obstructive deafness. If we inspect the membrana tensa critically, even after we have secured a fairly open and presumably functionating Eustachian canal, we are apt to find some degree of retraction. The cause of this may no longer be a condition of negative air pressure within the tympanum, but rather the structural habit or set of the membrane after years of tubal congestion and insufficiency. The membrane, therefore, like any fabric long inured to one position, tends after inflation gradually to lapse into the habitual but abnormal position of retraction.

Various measures, *e.g.*, multiple incisions, have at different times been proposed for correcting abnormal relaxations; there is, however, but one rational line of effort at our disposal, *i.e.*, to replace and retain the membrane in an approximately normal position, thereby giving nature a chance to restore normal tone. There is no other logical means to this end.

The paper splint is applied as follows: A disc of rice paper is cut to conform to the more relaxed or atrophied portion—*i.e.*, the portion most noticeably defective in structure or tension, and therefore least fitted either to transmit sound waves or to withstand even slight changes in tympanic pressure. After being soaked in alcohol, this is introduced deeply into the canal and placed against the posterosuperior canal wall. It is then slid into position and adjusted with a tightly wound cotton applicator. Such a splint, properly applied, will hold its position for weeks, though tending to move toward the nearest canal wall. Its adherence to the membrana tensa is so close that removal is difficult or impossible without soaking. If, therefore, the disc is applied immediately after inflation, its value in supporting a relaxed membrane in a relatively normal position becomes clear.

If the steps above outlined have been successfully carried out, we should have the following tangible results: A better functionating Eustachian canal; a more normally placed drum membrane; and a more normal balance between drum membrane and ossicles. Functionally these changes should be translated into improved hearing—not necessarily of the spectacular type, which occasionally follows immediately upon inflation and is as quickly lost. Rather it should be a clearer definition for all sounds, which, however moderate in degree, should be better sustained.

How without injury to the drum membrane to exercise or reëducate the ossicular chain to more effective transmission of sound waves. We cannot expect by any exaggerated or unnatural passive movements of the membrana tensa to improve sound conduction, because the resulting strain upon the membrane will first counterbalance and ultimately far outweigh any advantages from improved ossicular mobility.

We know that impressions of sound reach the inner ear chiefly through vibrations of the conducting mechanism excited by sound waves from without; that in obstructive deafness loss of tone perception begins at, and extends from, the lower end

of the musical scale. Why, then, is it not a logical procedure to make use of selected sound waves of low pitch but relatively great intensity to exercise the ossicles in just those movements (sounds) for which their mobility is known to be impaired?

Whatever increases general vitality or vigor tends to improve audition; and whatever hearing gain accrues from such means must be attributed to a better functioning nerve rather than to improved sound transmission. If we use every safe and rational means of stimulating the end organs of the acoustic nerve, remove all discoverable sources of infection or of nerve depression or injury, and endeavor to raise the tone or functional activity of the perceptive mechanism by improving general nervous tone and vitality, we do all that in the present state of our knowledge is possible in this direction. If we regard this phase of the problem as of negligible practicability or importance, we neglect a factor which is logically a part of any rational scheme of treatment.

Trigeminal Neuralgia.

COUGHLIN *(Ohio State Medical Journal,* May, 1924) thus describes the onset of this affection:

The patient is usually one going about his ordinary affairs of life and in usual health, when suddenly, without any warning whatever, a severe, sharp, stinging, burning or stabbing pain strikes him somewhere in the area supplied by the fifth cranial nerve, holds him helpless in agony for a few minutes, and is gone. In surprise he feels the part, perhaps looks at it, wondering that there is no visible or palpable evidence of the recent stroke, and in a few minutes it again assails him and again he endures the most fearful torture for what seems an eternity, but is really not more than a minute or so, and again he is as free from pain as at first. This continues at first for hours or days on end, and then the "attack" is over for a time. But it will return; perhaps he may enjoy freedom from pain for a year or more, but it will come back. As the attacks succeed each other they usually become of longer duration with an ever shortening interval of surcease, and finally the patient, unrelieved and rendered desperate, is drawn to opium or to death itself.

At first sleep is not interfered with, but as the attacks recur it often happens that the patient gets no relief night or day, and between loss of sleep and inability to take food he soon becomes weak and very ill indeed. Such is the picture of true trigeminal neuralgia major—tic-douloureux—a disease of unknown etiology and of unknown pathology. But notwithstanding our lack of such knowledge, we may say with pride that surgical science is not helpless to afford relief in this dread malady, relief permanent or temporary as the patient may desire.

Temporary relief may be had by the deep injection of alcohol, by which method 1 to 3 cc of alcohol is injected into the division affected where it leaves the cranium. This method is not applicable when the first division is involved because of the danger to the optic and ocular nerves, but for the second and third divisions it is a mode of treatment which should be considered.

Radical relief is obtained by cutting the sensory root of the Gasserian ganglion inside the skull between the ganglion and the brain. The operation was conceived by Spiller and first performed by Frazier, both of Philadelphia, nearly twenty-five years ago.

There is hardly any other major operation in which the mortality is so low. The masters in this work, Cushing, Frazier, and Adson, have a combined mortality of about one per cent, and they use general anesthesia. Under local anesthesia the mortality should be less.

There is no maiming whatever. The scar is entirely concealed by the hair and is a straight line only. Formerly there was atrophy of temporal and masseter, which led to an overprominence of the zygoma. Now we do not cut the motor

root and no such atrophy ensues. When the ganglion was removed it sometimes happened the eye was lost. Following root section, unless the ganglion has been much traumatized, eye trouble is rare. Care is taken for a while after the operation to keep the eye covered so as to exclude dust. The conjunctiva and cornea are insensitive, and attention must be directed to this and precautions taken to avoid dust and wind by wearing a goggle while driving. Sometimes after the operation there is a paralysis of the facial nerve of the same side; this is always temporary. Its cause is not known.

Open Treatment of Wounds.

OPPENHEIMER *(International Journal of Medicine and Surgery,* May, 1924) notes that in a recent "Surgical Treatment" over thirty-five old and new dressings are mentioned.

Dressings of any kind are confessedly not always desirable. Nevertheless, protection, disinfection, and the fear of infection are the rule.

Dressings are neither uniform in absorption, asepsis, antisepsis, nor protection. Gauzes of different meshes possess different degrees of absorptive powers. Applied too firmly or allowed to remain too long, or unsterile, they may reinfect, traumatize or necrose new tissues. The changing of a dressing usually traumatizes the wound.

To decide whether a dry or moist, a sterile or antiseptic, a light or firm pressure dressing is preferable is sometimes difficult.

The first dressing of a wound often decides the prognosis. Water and tincture of iodine are the people's panacea; and the blind faith in their use or their misuse determines the aftermath. The laity has long ago learned from the routine doctor that tincture of iodine is the only primary antiseptic worth while—so they resort to it under all conditions and for all wounds.

It will take a long while for the bulk of doctors to be convinced that tincture of iodine is not a faultless antiseptic. It is very painful on a raw surface; it is feebly antiseptic on a moist one; and unreliable on a wet wound. It is destructive of the superficial layer of tissue; it will blister or desquamate the surface at times.

Since our infancy all of us have seen wounds that had neither been cleaned, disinfected, nor covered, which healed promptly without infection or trouble—wounds of man and beast.

To the statement that every industrial wound is an infected wound, Colcord replies that the statement is true only in a relative sense. Lexer found in his Vienna clinic that his cleanest operating wounds contained 60 plus germs per square millimeter.

We have lost faith in the powers of the leucocytes, or have failed to give the free, dynamic, oxygenous air and the vitalizing sunshine due credit for their powers. Both are wonderful antiseptors and disinfectors, against which our ingenious art-antiseptics are not always embarrassing competitors.

The kinds of wound that are best treated without dressing are: most wounds of the head, scalp, face, neck, etc., of the hands and arms, and occasionally those covering large areas.

In little children, where dirty little hands cannot be controlled, these rules, of course, do not apply. Other exceptions must be left to the judgment of the physician.

Begin treatment by proper preparation of the wound: Cleansing, trimming, suturing, control of bleeding or oozing, drying, etc.

If necessary to disinfect, cleanse with any innocuous disinfectant. Where oozing continues, and in most minor cases, the wound is mopped occasionally with dry sterile gauze in clean hands, or gauze moistened with one of the disinfectants. This may be kept up for several days if indicated.

In the early treatment of all degrees of burns, picric acid has almost universally displaced other dressings. The author has never seen any evidences of toxic absorption from it, even when applied continuously on extensive burns. Most burns of the

first degree are well in twenty-four hours after being painted with it. Risley, in Ochsner's "Surgical Diagnosis and Treatment," Vol. IV, praises picric acid as the best remedy for burns, but adds that "Picric acid (dressings) and the open-air methods tried side by side on a large number of cases puts me in a position to positively state that the open-air treatment for extensive burns is vastly superior to any treatment in which any kind of dressing is used."

The Surgical Treatment of X-ray Burns.

BLAIR *(Journal of Urology,* May, 1924) on the basis of a ten-year experience with eighteen cases advises wide and deep excision and the application of Ollier-Thiersch grafts, which, providing the preliminary operation has been adequate, will successfully take and permanently remain.

Blair states that opposition to this radical procedure is based on the fact that the skin is not entirely destroyed and on the belief that, under conservative measures, it will restore itself in time. The story of these eighteen cases, however, proves that this is a vain hope and much needless anguish has been experienced by the victims of this belief over long periods of time (in one case seventeen years and most of them several years). A consideration of the pathology of these conditions reveals why they behave as they do and why the likelihood of spontaneous restoration of them to the normal is impossible. In the *x*-ray ulcer there is keratosis at the edge with a typical downward growth of epithelium with or without pearly body formation; a superficial zone of cellular granulation tissue; unusual scar-tissue formation which as a rule extends to muscle; thickening of the walls of the blood-vessels with endothelial obliteration; and minute abscess formation beneath the surface of the ulcer. The chief irremediable change is the obliteration of the blood-vessels.

The gross appearance of these burns presents all the stages of tissue change from slight telangiectasis to severe and deep ulceration. One peculiarity observed in some of them is a dry tanning of the area giving the appearance of a drum-head. The area does not slough *en bloc* quickly, but remains attached to the contiguous tissues half-alive, half-dead, of parchment-like appearance with very little inflammatory reaction, the patient always retaining the expectation that it will take care of itself. The more common form is the eczema-like aspect with its scattered patches of keratosis, its unending healing and breaking down, and the accompanying stinging, itching, and burning. For all of these conditions the method of excision is unhesitatingly advocated with the supplemental skin-grafting, except in the cases of telangiectasis, where from the cosmetic standpoint its application might be questionable.

The Minimum Standard of Care That Should Be Accorded the Puerperal Woman.

LANKFORD *(Virginia Medical Monthly,* May, 1924) for the purpose of his paper assumes the puerperium begins one hour after the third stage of labor. There should be a place on every chart or in every notebook for the following notes, which should be recorded by the attendant himself: One hour after the expulsion of the placenta, the temperature, the pulse, the location and condition of the fundus, and the amount and character of the lochia. If this be regularly done, certain accidents of the early puerperium will be avoided, and the later puerperium be made more comfortable. Most of the bleeding from the uterus takes place during the first hour after delivery, and if at the end of that time gentle, purposeful pressure be made upon the fundus, several clots, possibly large ones, may be expressed from the upper vagina or lower uterine segment, thereby saving the patient many uncomfortable after-pains as well as getting rid of a possible nidus of infection. However, the greater value of this close observation of the patient after

one hour is the prevention of what is often called a "late" or "secondary hemorrhage," which is usually not discovered until some hours later, when huge clots may be passed, which frighten the patient, the nurse, and the doctor. What has happened is not a secondary hemorrhage at all, but the later expulsion of previously formed large clots, the result of continuous oozing from the placental site.

The inner surfaces of a woman's thighs when apposed lightly seal the vaginal outlet, and when in addition a tight thick pad is applied and the woman cautioned to keep her knees together, we have, in the presence of slow oozing, all the conditions conducive to the formation and retention of clots, and for the continuation of the bleeding: the uterus cannot contract and retract properly when clots are present in its interior.

After six or eight hours or sometimes longer, depending upon various circumstances, the baby should be put to the breast for a period not to exceed five minutes. The nursing should be limited to five minutes at each period, until the milk begins to flow freely. Five minutes every four to six hours will be sufficient to exercise the needed stimulating effect upon the uterus and breasts, and to give the baby its immunizing (?) dose of colostrum. Such a schedule will slowly accustom the epithelium covering the nipples to the unusual strain, and give it a chance to react gradually, with thickening of the superficial layers, rather than rapidly, with probable blister formation. When the milk flow is established and the baby does not have to spend most of the time chewing the nipple, the period of nursing may be lengthened to fifteen minutes or thereabouts every three or four hours. Where a baby is satisfied and gains consistently on a four-hour schedule, such is unquestionably more satisfactory to all concerned than the three-hour schedule.

The nipples should be carefully protected at all times when not in actual use. Prospective mothers should be advised to have gowns opened down the front (by snappers), so that the breasts may be easily accessible: the necessity of having to pull the gown up from the bottom in order to properly expose the breast for nursing or examination is poor technique. A simple plan of protecting the nipples is this: an ordinary shoe eyelet is fastened on a small strip of Canton flannel, one by two inches (by a shoemaker, or a shoemaker's tool); such a strip is fastened on to the skin on each side of the nipple by a small piece of adhesive plaster; a square of gauze is then placed over the nipple and held in place by stretching a little rubber band from one eyelet to the other. Such a dressing is very easy for the nurse or mother to take care of, and the easier such little details are the more likely they are to be observed. When the nipples become sore or excoriated, the most comfortable protection is furnished by the lead or aluminum nipple shield, which is worn directly over the nipples at all times, except when being nursed.

Any crack or fissure should be touched at once, and quite accurately, by the solid stick of silver nitrate.

When the breasts become engorged and tender, as many do about the second or third day, nothing gives so much relief from pain as the proper application of two long, broad, supporting bands of adhesive plaster. Such bands should be two or more inches wide and long enough to stretch from axilla to axilla. While the breasts are held upward and inward (strongly) by the nurse, the lower band is applied and should run from one axilla to the other, under the breasts, exerting a lifting pressure. While the breasts are then held inward by the nurse, the second band is applied from axilla to axilla, and running across the upper portion of the breasts, exerting a strong inward pull upon each breast. The edges of these bands should not approach nearer than two inches to the nipples. If we look upon the breasts as a wheel with the nipple as the hub, the adhesive bands serve to keep the spokes or milk ducts straight, whereas the breast binder, no matter how carefully applied, seldom does

more than press the breasts back against the unyielding chest wall, with consequent kinking of the ducts and engorged blood and lymph vessels, with formation of tender lobules, or whole lobes may be thus affected. Such bands not only have the advantage of holding the breasts more comfortably and efficiently, but also have to be applied but once; the breast binder has to be opened and reapplied every time the baby nurses. There is no comparison between the relief afforded by the two methods. A woman who has been suffering for hours with engorged and hanging breasts will experience almost instant relief and will often spontaneously and gratefully thus express herself. After the stage of engorgement has passed the plaster should be removed, and will seldom have to be reapplied. If taken off at the proper time the skin will not have been irritated.

If the uterus has been made to evacuate the clots formed shortly after the expulsion of the placenta, and if despite this the contractions be of sufficient severity to keep the patient miserable, the one remedy that may always be depended upon to give relief is a small dose of morphine under the skin. It should be remembered (and explained to the patient) that a certain degree of after-pain is physiological and necessary: a small dose of morphine will relieve the pain without interfering markedly with the contractions of the uterus, which is the end to be sought.

In the interest of drainage, it is good practice to elevate the head of the bed in every case. With the promotion of efficient drainage also in view, the patient should be instructed to keep her knees well apart at all times. Several times during the twenty-four hours the patient should be turned, or made to turn, on her face with knees well apart, and kept in that posture for half an hour. This helps to empty the vaginal cul-de-sac where the lochia tends to collect, stagnate and cause unpleasant odors, if nothing worse.

Every effort should be made to have the postpartum woman void, before resorting to the catheter. There are very few who will be unable to void within the first twelve hours if the following routine be regularly observed: First, a warm bedpan and warm sterile solution poured over the vulva; if not effective, second, an s. s. enema, warm bedpan and warm solution poured over while enema is being returned; if still ineffective, third, a second s. s. enema and patient held in upright position by nurse while enema is returned. In the meantime the patient should be (subtly) threatened with catheterization if she does not void! If these all fail, sometimes the injection of one ampoule of pituitrin, given about fifteen minutes before the attempts at voiding are to be made, will produce the longed-for flow. If catheterization has to be done, as it sometimes will, it should be with minute care.

For the first week after delivery, it seems to be good practice to do away with purgatives and, in their stead, give s. s. enemas every other monring. McPherson, at the New York Lying-in, recently initiated this plan, and in three hundred and twenty-two cases thus treated there developed only three febrile temperatures during the puerperium, while in a like number of cases, treated as controls, at the same time, with the ordinary purgatives, there developed twenty-eight febrile cases.

Several days after delivery exercises should be begun for the purpose of strengthening the abdominal muscles. The simplest and easiest is to have the patient, without pillow, raise her head until she can dig her chin down against her chest; by this simple maneuver the muscles of the abdominal wall are gently exercised, as can be well demonstrated to the patient by having her lay her hand against her abdomen as she raises her head.

As to diet: let the normal case eat what she wishes and as soon as she wishes.

When a woman has been through an uncomfortable, trying pregnancy, followed by a difficult or prolonged labor, a good long rest in bed will surely be to her benefit. On the other hand, certain patients may be

allowed to begin getting up very much earlier. About the twelfth to fourteenth day a gentle pelvic examination should be made. Beginning displacements and subinvolution may be detected at this time and appropriate measures taken to correct them.

From the sixth to eighth week postpartum, a final examination should be made, which should be more or less of a complete physical. At the least a note should be taken on the weight, blood-pressure, urine, breasts, abdomen, pelvic floor, pelvis and contained organs. The importance of this final examination should be impressed upon the patient, else many will side-step it, wilfully or carelessly, until forced to seek relief at some later date, by symptoms that should have been, and in most cases could have been, prevented. A recently retroverted uterus is not difficult to replace; a displacement of long standing is not only more difficult to correct, but also less likely to stay corrected after the support has been removed. This in itself is sufficient reason for making a pelvic examination six weeks after labor.

The profession now pretty well recognizes the fact that some muscle tears are inevitable, and that the supporting fascias are always overstretched and torn, and that exceedingly few women have as good pelvic floors after childbirth as they had before. No woman should be discharged without having this explained to her, for two reasons: first, women should not be allowed to think that they will reassume the virginal state of their anatomy after childbearing, nor on the other hand should they be allowed to suffer from the uncomfortable consequences of badly torn structures, under the impression that such consequences are irremediable and that all women must suffer thus after parturition; second, the obstetrician should not be held totally responsible by the public for certain unavoidable conditions the result of childbearing. Such misapplied responsibility is encouraged whenever a woman is discharged without a final examination, or when, after such examination, she is not told her true condition but later on finds out from some other source.

Reviews

ANGINA PECTORIS. By Sir James Mackenzie, M.D., F.R.S., F.R.C.P., LL.D., F.R.C.P.I. The Oxford University Press, London and New York, 1924. Price $9.

It would be hard to find any one in the history of medical literature capable of carrying out so much original investigation and at the same time contributing so freely to the literature of circulatory disturbances as does Sir James. The publishers have seen fit to bring out this contribution in what might be called an edition de luxe, the pages being unusually wide, the paper heavy, and the whole volume most handsomely gotten up, containing no less than 77 illustrations, almost all of which are in the nature of sphygmographs or electrocardiographic records. The text is divided into 30 chapters and deals, of course, largely with Sir James's conception as to the origin of thoracic pain.

It will be recalled that he differs from the view that the causes of internal pain are identical with those of external pain. He frankly admits that while his studies extend over many years, and while they have on one hand thrown a new and unexpected light upon the subject of angina pectoris, nevertheless even he as yet does not evaluate their full import. He tells us that one of the purposes he had in preparing this text was to emphasize the need of research, since only by such methods can correct conclusions be reached.

He states that in reading the literature of angina pectoris he cannot but be struck by the number of unproved assertions made by different writers, some of their hypotheses being put forward on the most meager evidence or no evidence at all. He is firmly convinced that in dealing with angina pectoris we are dealing with the symptoms of a disease at an advanced stage, and that the conditions which follow the onset of these lesions in the great majority of cases are too obscure to be unraveled at present. The reader may think from this statement that it was hardly worth while for Sir James to have written so voluminously upon this subject. This view will be changed when he peruses the text. Naturally the earlier part of the volume discusses the mechanism of the heart-beat and the question of heart failure in response to effort, with the significance of pain in affections of the heart, emphasizing his point that the pain of angina pectoris is really a nervous reflex. He has little faith in coronary disease as a cause, although such a lesion is often found in such cases at autopsy.

Among the changes which take place with advancing years and which predispose to angina, there is the diminished capillary field with the resulting impaired blood supply, thereby increasing the labor of the heart which is already impaired. He deals with anomalous cases of angina, with the symptoms and signs which make an individual case grave, and with the manner of death when it occurs. He also makes a differentiation between primary and secondary angina and gives the differential diagnosis accompanying these states, with a discussion of the other conditions which are characterized by pain in the chest. Last of all he discusses the prognosis, the age at which death occurs in both the primary and the secondary types, and last of all in Chapter XXX discusses the treatment. This chapter covers seven pages.

Sir James warns against the common practice of telling an individual to make no effort, insisting that the proper thing to do is to prescribe the amount of effort which may be used and to learn when to stop making effort. By this means we do not make a bed-ridden invalid out of the patient.

The importance of a well-regulated diet and proper mastication of the food to avoid indigestion is also discussed. So far as drug therapy is concerned, he thinks that it cannot do otherwise than bring a "sense of humiliation," because in many instances no drug can remove the organic changes which underlie the production of this set of symptoms. In other words, drugs are palliative and not curative, and amongst these he considers the bromides, and especially ammonium bromide, useful, provided they are given in the dose of 20 grains three or four times a day for a week and then stopped for a week or ten days. In other instances he has found chloral in doses of three to five grains repeated several times a day of value, and prefers it to any preparation of opium. For the attack itself he, with others, suggests the use of nitrite of amyl inhalations or hot drinks containing whisky or brandy. In other instances nitroglycerin can be used, as we all know. He states that he has never hesitated to give repeated injections of a quarter-grain of morphine every quarter of an hour until the patient has relief, occasionally using chloroform inhalations in addition. He does not believe that digitalis has any definite advantage.

In the appendix, which covers one hundred pages, including the index, there are records of typical cases designed to illustrate the basis of the views which he has expressed in the preceding text, with two excellent plates. There is also a statement as to the methods which he employed at St. Andrews in examining cardiovascular cases.

LES TROUBLES FONCTIONNELS DU COEUR. By R. Lutembacher. Masson & Co., Paris. Price 45 francs.

To those who are continually engaged in the study of cardiovascular disease the name of Lutembacher is well known. He is one of those who, notwithstanding the fact that he bears a German name, never-

theless is a Frenchman in fact. The title of the book is the only misleading part about it. One would suppose that it dealt solely with what we commonly call functional diseases of the heart. As a matter of fact this meaning is evidently not intended by the author, since he discusses in addition to functional disorders the various types of myocardial degeneration with their clinical results, electrocardiography, sphygmography, valvular diseases and the consequences thereof. Adequate consideration is given to the modern conception of the physiology of the cardiac apparatus. The author discusses painful syndromes like angina pectoris and undue sensibility of cardiac action on the part of the patient. He also gives in detail the therapeutic measures which the majority of these conditions indicate, whether they be functional or organic. In other words, this volume may be considered as a very valuable description of our present knowledge of cardiac diseases. The volume contains 520 pages and no less than 297 illustrations.

Amongst the great mass of medical publications which, when they appear, raise the question in the mind of the reader as to why they should exist, this volume is noteworthy. Few books have come to our hands which contain so much that is useful, and few contain illustrations which are so appropriate as those which are to be found in this book. By its compilation its author has greatly added to the renown which he already possessed.

CHRONIC INTESTINAL STASIS. A Radiological Study. By Alfred C. Jordan, C.B., M.D., M.R.C.P. Oxford University Press, London and New York, 1924. Price $7.50.

The title-page of this book contains as a subtitle the words "Arbuthnot Lane's Disease." This seems to us to be rather stretching a point, for surely chronic intestinal stasis was recognized before Sir William wrote so enthusiastically about his surgical methods of treating it. While chronic intestinal stasis is an important thing to be considered, on the other hand we think it may be fairly stated that the pendulum is now swinging the other way so far as Lane's operation is concerned, so that Lane's radical surgical measures of relief are rarely resorted to, certainly in this country. This, however, has very little to do with the direct contents of this volume, which is divided into twenty-two chapters describing the author's methods, and results which he has obtained by the use of the *x*-rays. We note with interest that he extends the term "Dupuytren's contraction" from that condition of the hand which is so familiar to surgical students to a condition of the colon. More than half of the space of the text is taken up with illustrations, of which there are 315, including diagrams of the forms of apparatus which are employed by the author. A very large part of the text is taken up by case reports. The volume is one which most gastroenterologists will be glad to have and every roentgenologist should possess, since even if he does not believe in the gravity of intestinal stasis, as that term is generally used, he can learn much from its pages.

LE BISMUTH DANS LE TRAITEMENT DE LA SYPHILIS. By C. Levaditi. Masson & Co., Paris. Price 25 francs.

This book is a very noteworthy contribution to a live subject. As is well pointed out, the experimental researches of de Sauton and Robert concerning the action of bismuth upon the spirochete of syphilis was the first noteworthy contribution to this subject, followed by the studies of Sazerac and Levaditi at the Pasteur Institute. Having proved that bismuth had a definite specific influence by studies upon the rabbit, their experiments were carried over to human beings, so that in the past three years the profession has been able to determine to a large extent that the primary investigations led to definite therapeutic efficiency in man.

It is worthy of note that Levaditi, whose name is so familiar to the medical world through his important investigations in the laboratory and in the clinic, should have presented us with a volume on this subject

of 316 pages, with 31 black and white illustrations and one plate in colors. The book is noteworthy not only because it contains the opinions of the author, but also because it reviews in a most satisfactory and complete way all the literature which is of definite importance, dealing not only with the results which have been obtained in human syphilis by bismuth, so far as curing the disease is concerned, but discussing the facts as to its toxic properties, its rapidity of absorption and elimination, and its influence upon the trypanosome as well as upon the spirochete. Its value as a remedy in primary, secondary and tertiary syphilis is also considered. The general results seem to be that its greatest value is in neurosyphilis and in hereditary syphilis rather than in early syphilis. It goes without saying that there is a careful consideration of the relationship between the efficiency of bismuth and the Wassermann reaction. Those who are fortunate enough to be able to read French will gain much from a perusal of the pages of this book, the more so as the construction of the sentences is not involved and the meaning of the author is clear.

TRAITÉ ÉLÉMENTAIRE DE CLINIQUE THERAPEUTIQUE. By Gaston Lyon, M.D. Masson & Co., Paris. Price 70 francs in paper and 85 francs bound.

Dr. Gaston Lyon, Chief of the Medical Clinic of the Faculty of Medicine of Paris, has just published the eleventh edition of his volume upon "Clinical Therapeutics." It contains more than 1400 pages and may be well said to represent modern therapeutics from the French standpoint. An endeavor has been made to prevent the volume from growing with each edition by cutting out material which ceases to be of great importance. There is a thorough discussion of the arrhythmias, disorders of the sympathetic system, shock, the treatment of syphilis by bismuth and diabetes by insulin. It is needless to point out that he also considers vaccines, serums, and glandular therapy in detail. He then goes on to a consideration of peptone therapy and autoserum therapy. There is also a consideration of bacteriologic methods, of investigation of the sputum, of exudates and transudates, and of the cerebrospinal fluid, with a discussion of the methods of injecting the various arsenicals in the treatment of syphilis and other conditions.

The book is to French medical literature what only one or two of the standard high-class works on therapeutics are to medical literature in this department of medicine in the English language.

Because of its distinctive practical character and the large experience of its author, we venture to state that the twelfth edition will follow the eleventh even more surely than the eleventh followed the tenth.

THE FOUNDATION OF HEALTH. A Manual of Social Hygiene for Students. By William Barnard Sharp, S.M., M.D., Ph.D. Lea & Febiger, Philadelphia, 1924. Price $2.50.

This small volume of about 250 pages has been prepared by its author, with some illustrations, with the thought that too few intelligent people give themselves sufficient concern as to personal hygiene and allied health problems. He feels that Health Campaigns, so-called, always suffer from the inability of the public to comprehend their purposes. The present book is based upon a series of lectures given to junior students at the University of Chicago and for students entering the study of medicine at the University of Texas. The author, therefore, occupies a rather middle ground between writing for the person who is essentially a layman and for those who by their training may have more understanding of his terms and objects.

After an introductory chapter on the Problem of Health and Disease, he takes up The Function of the Skin, the subjects of Infection and Immunity in sixteen pages, Reproduction. He devotes the same number of pages to the Digestive System, the same number to Respiration and Body Heat, and Foods and Nutrition. The remaining chapters deal with Sensation and Motor Control, The Mental Processes, Physical Exercise, The Hazards of Childhood,

Health in the Home, and The Modern Health Movement.

As illustrative of the sensible position which the author takes, we find that while recognizing that the use of coffee in excess is unwise, he fails to believe that its moderate use is harmful, and under alcohol he points out that inherited traits lead to alcoholism rather than that alcoholism leads to inherited traits. In these modern days, under Volsteadism, he finds it necessary to warn against the use of alcoholic beverages made by inexperienced manufacturers.

THE FUNDAMENTALS OF HUMAN PHYSIOLOGY. By R. G. Pearce, B.A., M.D., and J. J. R. Macleod, M.B., D.Sc., F.R.S., assisted in the third edition by Norman B. Taylor, M.D. The C. V. Mosby Company, St. Louis, 1924. Price $3.50.

The first edition of this book was published in 1916. Compared with other books on physiology, it is brief, covering only 341 pages in fairly large type. How well it meets the needs of the undergraduate medical student would seem to be indicated by the fact that in the space of eight years it has reached the third edition. Doubtless some teachers of this department of medical instruction will consider that a more voluminous text is desirable. The fact that it bears the name of Dr. Macleod, so well known for his investigations in connection with the islands of Langerhans in the pancreas, naturally increases interest in the text.

The book is copiously illustrated with 71 engravings and 8 colored plates. The illustrations are well selected, and most of them are original. Some of them taken from other books form an exception to this statement, in the sense of being clear and well defined, as in Figure 21 taken from Howell's Physiology.

We have sometimes thought that the modern text-book on physiology was so exhaustive that it presented far too much for the undergraduate student to absorb. This volume possibly presents too little, but certainly leans to a more sensible conception of the needs of the novice in medical study.

THE NATIONAL HEALTH SERIES. Funk & Wagnalls Company, New York, 1924. Price per set $6, per volume 30 cents.

We have already called attention to the appearance of a number of these little pocket books published under the auspices of the National Health Council. We now have before us one entitled "Your Mind and Your Mental Health" by George K. Pratt, M.D.; another upon "Adolescence with Its Educational and Hygienic Problems" by Maurice A. Bigelow, Ph.D.; another on "The Health of the Worker and How to Safeguard It" by Lee K. Frankel, Ph.D., with the collaboration of Bessie Bunzel, M.A.; another entitled "Exercises for Health" by Lenna L. Meanes, M.D., who is the Medical Director for the Women's Foundation for Health; a fifth entitled "Home Care of the Sick When Mother Does the Nursing" by Clara D. Noyes of the American National Red Cross; and still another bearing the title "The Child in School, the Care of Its Health" by Thomas D. Wood, M.D., who is the Professor of Physical Education in Columbia University. It is manifest that each one of these volumes is intended for a definite purpose. As we have said in noticing earlier issues, their object is worthy of praise, and they are written in a safe and sane way so that members of the profession need feel no hesitancy in approving of them.

Notes and Queries

A Useful Mattress for the Relief of Rectal Incontinence.

In the July issue of the THERAPEUTIC GAZETTE there appeared a Progress item entitled "The Type of Mattress Useful in Cases of Renal Incontinence." The word "renal" is a typographical error. Dr. J. F. Montague, who wrote the original article, calls our attention to the fact that the proper title should be "The Type of Mattress Useful in Rectal Incontinence."